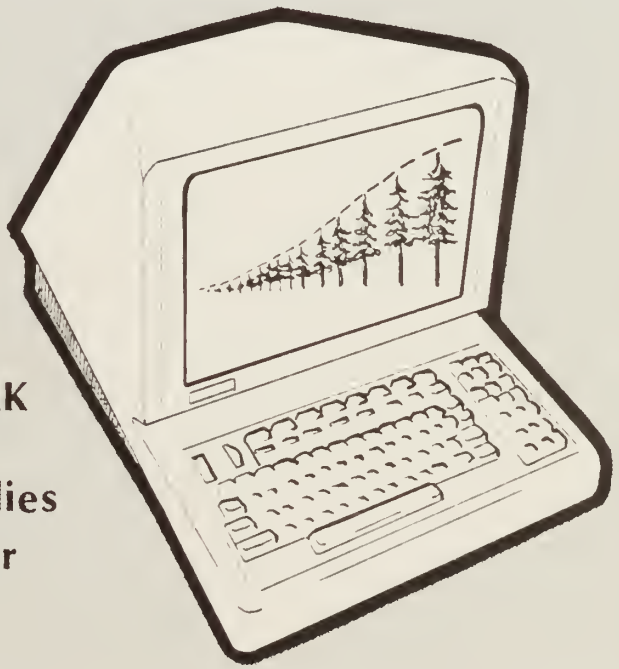
U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

TECHNICAL NOTE 348

U.S. DEPARTMENT OF THE INTERIOR – BUREAU OF LAND MANAGEMENT

DATA PROCESSING PROGRAMS FOR REMOTE TERMINAL USE for the Extensive Forest Inventory National Resource Lands



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Data Processing Programs

For Remote Terminal Use

For the

Extensive Forest Inventory

National Resource Lands

by

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A user assistance publication which features program explanation, job control language, and user response to time sharing system queries.

Copies of sample program inputs and reports are reproduced photographically in microfiche cards and may be obtained from the above address.

ACKNOWLEDGEMENTS

The author gratefully acknowledges the assistance of Herbert Runkle, Chief, Division of Special Studies, and of many associates in the development of this Technical Note.

Special credit is to be given to Roger Rainey and J. Eun Moredock, Division of Data Processing, for their work in modifying and converting the various forestry data processing programs for use on the BLM's new Honeywell 66/80 computer. Many of these programs have been made available for remote terminal use under the Bureau's Computer Time Sharing System.

Foreword

The Extensive Forest Inventory Project for the Bureau of Land Management (BLM) Public Domain States was initiated in 1970. This project was assigned to the Forestry Staff, Division of Standards and Technology, Denver Service Center (DSC).

The DSC Forestry Staff designed and carried out the inventory system project. Field work was accomplished with the assistance of District field crews. Data processing was done by the Division of Automated Data Processing (ADP) at the Denver Service Center. All phases were completed within the scheduled timetable.

Many data processing programs had to be developed to file, process, and analyze the mass of photo interpretational, field plot, computational, and forest simulation modeling data.

Most of these programs have now been made "interactive" so that they can be used directly from remote terminal locations. The remote terminal Time Sharing System (TSS) has recently been made possible by the purchase of the new BLM Honeywell 66/80 computer.

This Technical Note is designed to provide potential users with: (1) an explanation of the DSC Forestry-oriented programs and (2) a step-by-step application of their execution from a remote terminal.

In addition, a sample or program product report, which also gives an interpretation of the shorthand abbreviations, is available. See the envelope inside the back cover for microfiche cards containing sample problems.

The extensive inventory system uses a remote sensing (aerial photo) interpretational phase and a ground truth (field plot establishment) phase. Most data is computerized and can be found on the following:

1. Aerial Photo Interpretation Data Files
2. Field Plot Location Data Files
3. Sustained Yield Unit Master Files
4. Forest Simulation Modeling (SIMIX) Alternatives.

Upon completion of the inventory computational phase, the timber management planning phase was initiated; this phase is generally called "Allowable Cut Planning."

Forest lands and timber stands growing upon the land base are classified according to forest policy and economic, biologic, industrial and physiologic criteria. The same timber stand may be classified differently under each of the planning system concepts.

Potential harvest levels are developed under various planning system concepts such as: unrestricted tunnel vision, minimum and maximum funding, multiple-use restrictions, wildland management, and intensive forest management.

Under the policy of Continuous Forest Inventory (CFI), field plots that were established in the 1970s will be revisited and re-measured during the 1980s and periodically each decade thereafter.

The wise application of ADP programs can increase the efficiency of field foresters' time and also allow them to undertake projects once thought nearly impossible due to time constraints and the mass of data that must be handled.

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I. Introduction

Several data processing programs used in the forest inventory and forest management systems have now been made operational for remote terminal usage through the Bureau's Time Sharing System.

The wise application and use of specialized data processing programs will increase field foresters' efficiency and allow them to undertake projects previously considered nearly impossible because of the detailed, complicated mathematical computations and manipulations required.

For example, computation of actual periodic growth of a timber stand requires determining present tree volume, reconstructing the trees' measurements as of 10 years ago (through the use of height/growth data, radial wood increment data, bark growth factors, and form class changes) and computing the volume difference in actual, usable wood volume. When thousands of trees are involved, hand calculations of growth becomes an impossible task for a forest manager.

An objective of the forest management planning process is to develop a harvest level for the forest that is consistent with biologic resources, geologic and physiographic conditions, the planning system processes, and forest management policies.

The planning process involves a systematic approach for measuring, quantifying, analyzing, and evaluating the following:

1. Existing timber resources of the forest.
2. Potential productive capabilities of the timber resource.
3. Productive potential of the forest land.
4. Economic value of timber and other natural resources.
5. Relationship of timber values to other forest resource values and uses.

To analyze the forest resources of BLM's public domain timber lands, an extensive forest inventory was initiated in 1970. This inventory project was assigned to the Forestry Staff, Division of Standards and Technology, Denver Service Center.

A two-stage inventory system involving an aerial photo interpretational phase and a field plot establishment phase was designed. District crews established the field plots, and the Denver Service Center handled the data processing.

Upon completion of the inventory computational phase, the timber management planning phase for each of the 17 sustained yield harvest units was undertaken. This phase is generally called the "allowable cut development phase" and uses the SIMIX forest modeling system.

Many data processing programs had to be developed to file, process, and analyze the tremendous mass of photo interpretational, field plot record, computational, and forest simulation modeling data. A typical forest inventory unit contains:

1. A photo master file of approximately 8,000 to 10,000 photo interpreted points (each is 112 character records in length).

2. A field plot location master file of 500 to 1,000 field plots containing approximately 10,000 individual tree records (each tree record is 632 character records in length).

3. A series of 10 to 30 potential forest harvest level alternatives developed through the forest simulation modeling system.

Numerous regression equations were developed during the analysis and computational phases to develop character records such as: tree form class, annual diameter increment, net volume per acre, site quality, mortality projections, predicted growth, etc. Combined tree, site, stand, and age class data were used to project future yields under both nontreated and treated conditions. Several levels of intensive management (silvicultural practices) were prescribed and analyzed, conforming with economic investment criteria.

In 1979, a new Honeywell Model 66/80 computer was purchased to replace the old Burroughs 5500. In addition, the DSC was reorganized, and the Division of Standards and Technology was dissolved. To provide needed forestry assistance and services to State Office and District staffs, the Division of Special Studies forester scheduled a work assignment to update pertinent data processing programs for operation on the Honeywell. These programs were converted to an "interactive" mode so that potential users could operate them directly from remote terminal locations throughout the Bureau.

This Technical Note is designed to provide users with an example of the product (report) and a step-by-step procedure of the necessary keyboard inputs required to produce the report through the Time Sharing System.

It is recommended that persons not familiar with data processing techniques take some of the courses offered through the DSC's Learning Center, such as: (1) the Terminal Users' Course, and (2) Introduction to the H6000 Series, Honeywell Computer.

Each of the individual program sections contains information about program execution and the response one must give to the queries as they appear on the terminal. These sections show how to monitor the job, hopefully to the "Normal Termination" point.

The photo interpretation computer and field plot master file layouts are shown on pages 15 and 25. To extract desired information from these files, the position, picture codes, and item codes must be identified.

Program users must have an account number (Users' Master Catalog) including password and file storage space. The BLM Computer Users' Guide (Information Release #1) tells how to request an account number. These requests are normally routed through State ADP Coordinators to Technical and User Support, Divison of Data Systems Technology, D-221.

To obtain "read" permission and assistance in using these programs, please contact the Division of Special Studies, D-450, Forestry, at FTS 234-2374, or the Division of Data Operations, D-236, Maintenance Programming and Assistance, at FTS 234-2267.

Some programs discussed in this Technical Note have not yet been converted for universal use by all potential users. Other programs such as SIMIX require a specialized set of 23 pages of input forms and possibly a training program for program execution and interpretation of printouts. Also, some program execution directions may be revised periodically due to modifications in either computer hardware or software. If, while trying to operate one of the programs, a message is received on your terminal such as: Request Denied, Non-Existent, Permission Not Granted, Not in TSS Format, Block Sequence Error, etc., and you are unable to resolve the problem, please contact the DSC offices listed above.

Sample Problems

(Microfilmed)

1. Polynomial Regression
2. Stepwise Regression
3. Investment Analysis

Please refer to the pocket

envelope inside the back cover.

II. Time Sharing Programs

Honeywell Informations Systems, Inc., publishes a series of manuals describing the operation and maintenance of special purpose subsystems and the batch type programs that are available. A few of these are: General Information; Software, File Management Supervisor; Text Editor; Time Sharing Systems, Terminal/Batch Interface; and Fortran.

This chapter contains several excerpted functions and commands that are useful in executing individual programs. The users are encouraged to develop their own file of aids which provide useful library material for programs used only periodically.

A. Create a Catalog, Create a File, Etc.

The File Management Supervisor administers information about files and authorized users. In the user substructure, the User Master Catalog (UMC) indexes catalogs, subcatalogs, sub-subcatalogs, and files. The Access Subsystem provides an interface between remote terminal users and the File Management Supervisor.

1. Procedures.

Use the following procedure to create, modify, purge, protect, etc., a catalog or file title or file space under a specific catalog listing. The system will provide a list of queries for the catalog and file specifications, such as: File Name, Originator, Maximum File Size, General Permissions, etc.

The underlined words or sympbols shown are the responses, queries, or answers printed by the terminal. User responses to queries are identified by apostrophies.

a. Log On by calling the appropriate telephone number. The terminal will request that you identify the terminal that you are using: ENTER ID, TRML, PW
? 'T999,TYP9'

(The above request has been eliminated at the DSC.)

Respond with the correct terminal identification as shown above. The terminal will then request your user identification code and your secret password as shown below:

b. USER ID 'A134'

c. PASSWORD

d. 'XXXXX'XXXXX

e. * The asterisk shows that all systems are ready to go. In response to the asterisks, type in the word ACCE. ACCESS is a subsystem of the file system that allows the user to create, modify, delete, etc. catalogs, subcatalogs, and file space.

f. * ACCE - The word FUNCTION? will be printed. Respond with the function you wish to perform, such as: LC (list the names of your catalogs), CF (create a file name and file space), etc. Type in the letters CF after the word FUNCTION appears.

g. FUNCTION? 'CF' The computer has now been requested to create a file under your user identification number.

h. Respond to the machine queries as requested. To test the results of your input, return to the system level and ask for a print listing of the information about your file space that the computer has, as shown by the following example:

```
*'CATA /DATA/DATA5'

Data file number 5 was created on Feb. 11 and has been
modified on Feb. 14.  The entire following listing is
printed:

FILE NAME-DATA5
ORIGINATOR-A134
DATE CREATED-021180
DATE CHANGED-021480(15.092)
LAST DATE ACCESSED-021980
NUMBER OF ACCESSES-21
MAX FILE SIZE-50 LLINKS
CURRENT FILE SIZE-13 LLINKS
FILE TYPE-LINKED
DEVICE-DP7
GENERAL PERMISSIONS-R,W,A,E
SPECIFIC PERMISSIONS-NONE
```

2. Procedural Notes.

a. Users must have sufficient file space available under their UMC authorization code.

b. Users should keep a personal record of their catalogs and files and their contents for ready reference.

c. Refer to the TSS General Information Manual for a definition of general and specific permission.

d. Files can also be created through the use of the "SAVE" and "RESAVE" commands and other systems as defined in the TSS Manual.

B. Loading Data Into Permanent Files.

The CRUN command initiates processing of the input command file, which contains the user's terminal responses in the proper order. The LOAD DATA command uses the LODX subsystem, which provides a service function for the Time Sharing System. Note: CRUN is pronounced as two words, i.e., C RUN.

1. Procedures.

The following procedure for executing CRUN DATA/LOADDATA will transfer keyed data from a key-tape to a permanent disc file. This data file will remain intact until it is overlain with new keyed data, or until the disc file that it occupies is released.

a. Log On

b. USER ID 'A134' (Users UMC)

c. PASSWORD

d. 'XXXXX'XXXXX

e. * When the asterisk appears, enter A134/LOADDATA,R and punch the CR key. The following request will appear:

ENTER USER IDENTIFICATION. _ _ _ _, _ _ _ _ _ _ _ _ _

f. Key in your user identification code. Then punch the carriage return key.

Users outside of the DSC using central computer high speed prints are requested to enter their Mail Code and Name on the $IDENT card along with their UMC, i.e., $IDENT UMC, MAIL CODE NAME.

EXAMPLE: $IDENT A000, UT-930 JANE DOE

This procedure will insure that the listing will be sent to the user in a timely manner. All listings carrying a mail code will be sent out as priority mail.

Only the first nine spaces following the comma will appear as the banner (letters one inch tall on the first page of each job report).

The A134/LOADDATA program will go to a normal termination without the need for printing a report of your job request. Check the contents of your data file by using the CONVERT and EDIT systems.

After entering your ID, a second message request will appear:

ENTER TRANSACTION REEL NUMBER. _ _ _ _

g. Key in the key-tape number (Example: K999) containing the transaction data. Key-tape numbers are assigned by the Operations Branch of Data Processing and are entered in PRMFL A150. Users must obtain permission from Key Entry to "read" the key entry file and copy the data onto their permanent file.

h. Punch the Carriage Return key. The terminal will then print the following words:

ENTER OUTPUT FILE CATALOG STRING. _ _ _ _ _ _ _ _

i. Key in the name of the permanent disc file on which the transaction data will reside and punch the carrage return key. The terminal will then print the following job information:

```
*RUN
SNUMB # XXXXT
*COUT
*
```

The job apparently was accepted and will go to normal termination.

j. To monitor the job execution, key in JMON "SNUMB" as shown in the following sample upon receiving an asterisk (*) prompt:

```
* JMON 1660T

1660T-01 - WAIT TAPE @ 14.310
1660T-01 - WAIT CORE @ 14.325
1660T-01 - EXECUTING @ 14.328
1660T-01 - SWAPPED @ 14.329
1660T-01 - EXECUTING @ 14.330
1660T - OUTPUT WAITING @ 14.333
NORMAL TERMINATION
```

k. Upon Normal Termination, release the SNUMB. Punch: RELE "SNUMB"

2. Procedural Notes.

a. Users must have file space available and ready to receive all of the data on the key tape. Check the maximum file size.

b. Users should keep track of the contents of each file.

c. Upon normal termination, users may proceed directly to the execution of a regression problem, a SIMIX run, the REX System, an IVST Program, CONVERSION and EDIT Programs, or other OBJECT or DATA programs.

3. List Job Control Language.

```
*OLD A185/JCL/LOADTREE,R
*LIST

##N,J
$:IDENT:22222
$:CONVER
$:TAPE7:IN,XID,,11111,,XACTIONS,,DEN5
$:INPUT:LODENS,MBCD,NLABEL,NSER,FIXLNG/14
$:PRMFL:OT,W,S,33333
$:ENDJOB
```

4. List CRUN.

```
*LIST/LOADDATA

##*NULL
OLD A185/JCL/LOADTREE,R
SYST
$*$MARK
$*$MARK
EDIT CASE
RS:?22222?
$*$USER = ENTER USER IDENTIFICATION.
$*$NULL
RS:/11111/
$*$USER = ENTER TRANSACTION REEL NUMBER.
$*$NULL
RS:?/?33333?
$*$USER = ENTER OUTPUT FILE CATALOG STRING.
$*$NULL
SYST
COUT NULL
RUN
COUT

*(Computer is waiting for a new command.)
```

C. Converting BCD to ASCII to BCD.

The CONVERT subsystem employs commands that permit conversion of text information from one text file format to another. Refer to the TSS Terminal Batch Interface Manual for details on the CONVERT Subsystem.

Data submitted to the Key Entry Branch for keypunching is entered on the file in BCD format.

1. Procedure.

The CONVERT Program converts BCD machine language to ASCII language so that the file may be read in conversational English for editing and other purposes. The files must be converted back to the BCD language for proper machine execution of the program.

a. Log on

b. USER ID 'A134'

c. PASSWORD

d. 'XXXXXXXXXXXX'

e. * When the asterisk appears, enter CONVERT and the disc file name. Example: "CONVERT /DATA/DATA1". Upon completion of the conversion process, another asterisk will appear.

f. When this asterisk appears, enter the EDIT mode so that the current file may be printed, reviewed or updated. Example: *'EDIT VERI STRI CASE' - This sample coding requests verification of edit corrections made in either upper or lower case and in a string mode.

g. Perform Edit operations of the file data as required. The Edit program prints a dash "-" as a prompt message.

2. Resaving Edited Data.

To save and replace the edited data back onto the same disc file.

a. Key in the word "RESAVE" in response to an editor dash "-" prompt, and identify the file you wish to save. Example: -RESAVE /DATA/DATA1. Put edited Data #1 file information back onto the computer's disc space.

b. End the edit function with the response "DONE" immediately after a dash "-" edit prompt. Example: -DONE
An asterisk will then appear. The user must now reconvert the corrected data from the ASCII language to the BCD language so that the computer can operate object programs as requested.

3. Reconverting ASCII to BCD.

To place the edited file back onto the disc file in machine language, do the following:

When the asterisk appears, enter the CONVERT command, identify the files used, condense the file back to an 80 column (card) format, and verify the process.

Example 1:

```
*CONVER /DATA/DATA1 = /DATA/DATA1:BCD, C(1-80), V
```

Example 2:

```
*CONVER *=/DATA/DATA1:BCD, C(1-80)
```

The second example uses an asterisk to identify the "current" file and does not request a verification of the action.

D. In Limbo Option: At the End of the Day.

Your job may have been placed in limbo for extended periods of time for a variety of reasons. The computer may be waiting for peripheral equipment, it may be overloaded, your job may have a low priority, or a breakdown may have occurred.

You may not be available to direct the completed job to the printer after it has gone to normal termination. The following system allows you to leave with your carpool and be assured that sometime during the night your project will be completed:

Example: (Job in Progress)

```
6666T-01 WAITING CORE @ 17.501
      Time to leave with carpool

Step
  #1.  Punch the break key:  BR
           An asterisk appears
  #2.  Punch:  UNJO "snumb", i.e., UNJO 6666T
  #3.  Punch the Carriage Return key:  CR
  #4.  Pick up the job the next morning.
```

E. Other Honeywell Systems.

Refer to the Level 66, TSS General Information Manual for the functional listing of Honeywell publications which cover all phases of computer operations. Refer to individual Honeywell manual sections for a full explanation of each TSS subroutine.

III. Photo Interpretation Phase

Numerous photo identification points were selected and identified on large-scale aerial photographs during the P.I. phase of the two-stage inventory system (see p. 14, DSC 5214-1).

From 4,000 to 27,000 P.I. points were recorded for each of the 17 sustained yield inventory units. Point locations were also transferred from the aerial photos onto large-scale topographic maps.

Both photo and map data were recorded on DSC forms, keypunched, and coded onto the P.I. Master File computer tape.

The Data File Layout Sheets, pages 15 and 16, shows the data elements and their attributes. The control number refers to DSC Form #1265-23 where detailed specific information about each element is recorded.

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FEBRUARY 1972

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

BLM PHOTO POINT SAMPLE RECORD

PAGE ____ OF ____

2 CONTROL 7	8 AREA IDENTIFICATION		23	24 OTHER 34	80 GENERAL STATEMENT
70 INVENTORY UNIT	1 STATE	2 SURVEY UNIT	86d MERIDIAN	
90 SERIES	3 COUNTY	91 HYDRO REG SUB REG	97 TOTAL POINTS	
	11 BLM DISTRICT	98 REGION NF 0 9 9	77 INTERPRETER	
96 ACTION	12 PLANNING UNIT	99 WORKING CIRCLE 9	6 DATE	84 EDIT

8 PHOTO POINT IDENTIFICATION 21					22 LEGAL DESCRIPTION 33			34 PHOTO INTERPRETATION 5								51 AUXILIARY DATA									
81b	81c	81d	81e	81f	86a	86b	86c	7	35	30	21	49	51			56	53			95	50	60	85	65	
													STAND ISOLATION												
SYMBOL	ROLL NUMBER	PHOTO NUMBER	POINT NUMBER	NUMBER OF POINTS	TOWNSHIP	RANGE	SECTION	LAND USE	DENSITY	CROWN DIAMETER	AVE STAND HEIGHT	STAND VOLUME	ACRES	DIST	TYPE	FOREST TYPE	ASPECT	SLOPE	PHYSIO	ELEVATION	PAST TREAT	LAND RESTRICT	SOIL TYPE	MAP QUAD	
81b	81c	81d	81e	81f	86a	86b	86c	7	35	30	21	49	51			56	53			95	50	60		65	

DEPARTMENT OF THE INTERIOR
Bureau of Land Management

DSC-1265-26
March 1972

DATA FILE LAYOUT SHEET

PD EXTENSIVE FOREST INVENTORY SYSTEM

GPO 840-675

PROGRAM NAME: PD-INVENTORY SYSTEM	ID:	PAGE 1 OF 2
FILE NAME: PHOTO INTERPRETATION MASTER	FROM:	TO:
DESCRIPTION (FD MD SD) PI-MSTR	[X] INPUT [X] OUTPUT	FILE CONTAINS:
ACCESS MODE: SEQUENTIAL	BLOCK: 20-RECORDS	RECORD: 112 CHARACTERS
LABEL: STANDARD	VALUE OF ID: ADFL202 & AMFL204	SAVE FACTOR: 999
DATA RECORD (01) PI-REC	ACTUAL KEY:	
FILE SEQUENCE: LOCATION (EACH)		

LEV	DATA ELEMENT MNEMONIC	INQ-CNTL	ADD ITM	PICTURE	POSITION BEG.	POSITION END	SIZE	CONTROL NUMBER
01	PI-RECORD			X(112)	001	112	112	
05	INV-UNIT	01		99	001	002	2	070
05	SER	02		999	003	005	3	190
05	ST	03		99	006	007	2	101
05	CNTY	04		999	008	010	3	103
05	DIST	05		99	011	012	2	111
05	PLN-UNT	06		99	013	014	2	112
05	SURV-UNT	07		9	015	015	1	102
05	HYDRO	08		99	016	017	2	191
05	RGN	09		999	018	020	3	198
05	CIRCL	10		9	021	021	1	199
05	PM-ZONE	11		99	022	023	2	186/166
05	PI-PNT-CNT	12		9999	024	027	4	197
05	INTPR	13		9	028	028	1	177
05	PI-DATE			XXXX	029	032	4	
10	PI-MO	14		99	029	030	2	105
10	PI-YR	15		99	031	032	2	106
05	PHOTO-DATA			X(11)	033	043	11	
10	SYMB	16		XXX	033	035	3	181
10	ROLL	17		XXX	036	038	3	182
10	PHOTO	18		XXX	039	041	3	183
10	PI-PNT	19		99	042	043	2	184
05	FILLER			XXX	044	046	3	
05	ST-COORD			X(12)	047	058	12	
10	ST-EAST	20		9(5)	047	051	5	
10	FILLER			X	052	052	1	
10	ST-NRTH	21		9(5)	053	057	5	
10	FILLER			X	058	058	1	
05	UTMS	(R)		X(12)	047	058	12	
10	EASTING	23		9(6)	047	052	6	167
10	NORTHNG	24		9(6)	053	058	6	168
05	LEGAL	(R)		X(12)	047	058	12	
10	TWP-NO	25		999	047	049	3	187
10	TWP-FRCT	26		9	050	050	1	161
10	TWP-DIR	27		X	051	051	1	162
10	RNG-NO	28		999	052	054	3	188
10	RNG-FRCT	29		9	055	055	1	163
10	RNG-DIR	30		X	056	056	1	164
10	SEC	31		99	057	058	2	189

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DATA FILE LAYOUT SHEET

PROGRAM NAME: PD-INVENTORY SYSTEM	ID:	PAGE 2 OF 2
FILE NAME: PHOTO INTERPRETATION MASTER	FROM:	TO
DESCRIPTION (FD MD SD) PI-MSTR	X INPUT X OUTPUT	FILE CONTAINS
ACCESS MODE: SEQUENTIAL	BLOCK: 20-RECORDS	RECORD: 112 CHARACTERS
LABEL: STANDARD	VALUE OF ID: ADFL202 & AMFL204	SAVE FACTOR: 999
DATA RECORD (01) PI-REC	ACTUAL KEY	
FILE SEQUENCE: LOCATION (EACH)		

LEV	DATA ELEMENT MNEMONIC		INQ-CNTL	ADD ITM	PICTURE	POSITION BEG	POSITION END	SIZE	CONTROL NUMBER
05	STRATA		32		99	059	060	2	107/108
05	P.I. DENS		33		99	061	062	2	135
05	CRWN-DIA		34		99	063	064	2	130
05	STND-HGT-X				X(3)	065	067	3	
10	FILLER				XX	065	066	2	
10	STND-HGT		37		9	067	067	1	122
05	STND-HGT-9	(R)	37		999	065	067	3	122
05	STND-VOL		38	+	S999	068	070	3	149
05	STND-ISOL		39		X(5)	071	075	5	
10	ISOL-ACRES				99	071	072	2	151
10	ISOL-DIST				99	073	074	2	151
10	ISOL-TYPE				X	075	075	1	
05	PI-FORS-TYP		40		99	076	077	2	156
05	PI-ASP		41		X	078	078	1	153
05	PI-SLP		42		X	079	079	1	154
05	PI-PHY		43		X	080	080	1	155
05	ELEV		44		999	081	083	3	195
05	TRTMT		45		99	084	085	2	150
05	LND-RESTRCT		46		99	086	087	2	160
05	SOIL-TYPE		47		XXXX	088	091	4	192
05	MAP-QUAD		48		XXX	092	094	3	165
05	TRAN-ZONE				XX	095	096	2	
10	OWNRSHP				9	095	095	1	
10	PI-SINDX	(R)			X	095	095	1	
10	LOCATN				9	096	096	1	
05	PI-ACRS		51	+	999V999	097	102	6	109
05	ADJ-FCTR		52	+	9V9999	103	107	5	196
05	LOC		53		999	108	110	3	204
05	FILLER				XX	111	112	2	
P.I.	File modified in 1980 through Program ACFL300.								
P.I.	File was expanded to a length of 150 characters.								
05	Consecutive No.				9(6)	113	118	6	
05	TPCC				X(8)	119	126	8	
05	TPCR-W				XX	127	128	2	
05	MFP REST.				X(8)	129	136	8	
05	FILLER-Site-Soil-etc.				X(14)	137	150	14	

IV. Field Plot Location Data

All field plot location data, both measured and observed, are recorded on a series of DSC forms which have been modified over the years. An example of Form DSC 5215-1 follows on the next page.

The keypunched data are subjected to an edit program and recycled until the edit printout emerges error free. A permanent file tape is stored in the computer archives. Not all errors or omissions found were corrected or updated on the original field sheets; therefore, it is essential to maintain a corrected file of permanent field sample plot data.

Programs for keying and editing original extensive forest inventory plot data have not been converted for use on the Honeywell Time Sharing System. When it becomes necessary to re-measure these field plots, notify the Service Center, and special printouts can be developed to display the required data.

DSC-5215-1
March 1973

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

BLM FOREST INVENTORY SAMPLE RECORD

Page ______ of ______

2 AREA IDENTIFICATION 14

70. INVENTORY UNIT
4 LOCATION NO
96. ACTION [3]

5 SAMPLE KIND [1]
6 DATE OF SURVEY
YR MO DAY

15 AREA CLASSIFICATION 37

8 GROUND LAND USE
56 FOREST TYPE
57 STAND SIZE
54 STAND AGE
75. B A F
76 B A S

53a. ASPECT
53b. SLOPE
53c PHYSIOGRAPHY
55 SEED SOURCE
19a AGE TO B.H
97. NO LINES

80. GENERAL STATEMENT ______

MAP QUAD

P.I. DATA

1. STATE
2. SURVEY UNIT
3 COUNTY
7. PI LAND USE
10. OWNER CLASS
11. BLM DIST.
12. P U.
95 ELEVATION
77 FIELD CREW
LEADER ______
ASS T ______

PLOT LOCATION

71. RP to PLOT
Sp. DBH Az. Dist.

72. POINT 1 REFERENCE
Sp. DBH Az Dist
1. ______
2. ______

81. PHOTOS Scale ______
Symbol ______ Roll ______
Photo Nos. ______

86 LEGAL DESCRIPTION
T. ______ R. ______ Sec. ______
Meridian ______

87. DECLINATION ______

79. TEN POINT LAYOUT

EDIT
83 FIELD
84. OFFICE

TREE IDENTIFICATION (8–22)						TREE MEASUREMENT (23–42)							TREE CLASSIFICATION (43–77)													REMARKS
																		LOG DEDUCTION CODE (51–70): xx LOG POSITION, x TYPE DEFECT, xx % DEDUCTION								
POINT NO	TREE NO	AZIMUTH	DISTANCE	TREE HISTORY	SPECIES	D B H	BARK THICKNESS	10 YEAR RAD GRO	TREE AGE @ B H	TOTAL HEIGHT	MERCH HEIGHT	LOG GRADE	SURFACE DEFECT LIVE / DEAD	CROWN RATIO	CROWN CLASS	DAMAGE-CAUSE OF DEATH	SEVERITY					TREE OR COVER CLASS	ADDITIONAL SEED SAPS	SITE INDEX		
15	16	13	14	17	18	19	45	20	37	21	23	26	27	31	32	33	33a	42	42	42	42	34		73		
x	xxx	xxx	xxx	xx	xxx	xxx.x	xxx	xxx	xxx	xxx	xxx	x	xx	x	x	xx	xx	xxxxx	xxxxx	xxxxx	xxxxx	xx	xx	xxx		

V. Location Observation Worksheet

The location observation worksheet DSC 5215-4 (p. 20), was developed because of the need to record general (observed) data about the field plot location and the forest acreage surrounding the plot location. It is a form for recording the following: (1) timber stand prescription comments; (2) nontimber uses, both actual and potential; (3) wildlife habitat condition and use; (4) timber stand condition; (5) accessibility; (6) physical site condition, etc. It is also used by field crews as a checklist to assure that miscellaneous management facets of timber production are reviewed before leaving the plot scene.

Carefully completed worksheets save countless hours of travel time and duplication of effort by providing forest managers with a dated, permanent record of individual timber stands for planning, scheduling and operational activities.

Observation worksheets have undergone several major revisions during the past decade. Additional revisions or updates are usually necessary as new needs arise or management emphasis changes.

Observation worksheet data is keypunched onto a separate data tape, printed on an ADP report, and edited. This data may or may not have been transferred onto the master file for the inventory unit.

Additional field plot location data may be required for specific purposes. A copy of Form 7310-18, Comparison Area Data: Soil Surface Factor-Ground Cover, is on page 21. Soils information was recorded on watershed management forms on most forest inventory units.

DSC 5-15-1
April 1974

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

BLM FOREST INVENTORY – LOCATION OBSERVATION WORKSHEET

FILE ID
ACFL 221

AREA IDENTIFICATION

INVENTORY UNIT
LOCATION NO
ACTION 3

COMMENTS

DATE | EXAMINER

CARD 1:

8				14	15		STOCKED AREAS			42	43		NON-STOCKED AREAS							58
Habitat Type ⓪	STRUCTURE	Principal Canopy	Years since logged	POSITION	SPECIES Primary	SPECIES Secondary	Total Stand Age	Percent of Canopy Cover	Average Growth Rate	Years can be held on stump	Percent Ground Cover: Barren	Sod	Debris	Duff	Low Brush	High Brush	Years Since Denuded	Cause of Non-Stocking
XXX	A	B	XX		XXX	XXX	XXX	XX	C	XX	XX	XX	XX	XX	XX	XX	XXX	D
				Over (15-28)														
				Under (29-42)														

CARD 2:

RATING	Principal Stand Condition: Risk Level	Mortality	Insect Damage	Disease	Animal	Fire Damage	Weather Damage	Other	Non-Timber Uses: Wild Animals	Domestic An	Raptors	Mining	Recreation	Other	Physical Condition: Mass Movement	Seepage	Rills Sheet	Gullys	Rocks	Steep	Size of Area Affected Acres (68-70)	Erosion Coeff. ① (71-72)	① Visual Impact Zone (73)
	X	X	E	F	G	X	H	X	I	J	K	X	L	X	X	X	X	X	X	X	XXX	XX	T
Light (8-27)																							
Medium (28-47)																							
Heavy (48-67)																							

CARD 3:

8 WINDFALLS		SNAGS		ACCESSIBILITY				PRESCRIPTION					31	32				39
No./Ac	Ave. DBH	No./Ac	Ave. DBH	Nearest road (mi.) (tenths)	Road Chance	Operability	Why Not Log?	Years to Next Cut	Harvest Method	Slash Disposal	Planting Preparation		Intensive Management		Wildlife Use	Browse Species 1	2	3	4
XX	XX	XX	XX	XXX	M	N	O	O	XXX	P	Q	R	R	S	S		X	X	X	X
																Hedged (32-35)				
																Not Hedged (36-39)				

A
0. Nonstocked
1. Immature Only
2. Mature Only
3. Two-story 1-Mature
4. Overmature
5. Multistory

B
0 Nonstocked
1. Seedlings
2. 1.0" – 5.0" dbh.
3. 5.0" – 9.0"
4 9.0" – 16.0"
5. 16.0" plus

C
1. Accleroting
2. Decelerating
3. Stagnant
4 Constant

D
1 Logging
2 Fire
3 Insects
4 Disease
5. Rodents
6. Grazing
7 Unstable
8. Other

E
1 Bark Beetles
2 Defoliators
3 Other

T
1 Foreground
2 Foreground not visible
3 Background

F
1. Rusts
2. Rats
3. Mistletoe
4. Other

G
1. Porcupine
2. Domestic
3. Wild
4. Other

H
1. Snow
2. Wind
3. Water
4 Other
5. Lightning

I
1. Deer
2. Elk
3. Moose
4. Bear
5. Other

J
1. Sheep
2 Goats
3. Cattle
4. Horses
5. Other

K
1 Osprey
2 Eagle
3 Hawk
4 Other

L
1 Scenic
2 Hunting
3 Hiking
4 Camping
5 Other
6. OSV
7. Area Historic

M
1 Easy
2 Medium
3 Diff

Q
0 None
1 Broadcast Burn
2 Pile & Burn
3 Lop & Scatter
4 Pile
5 Chip
6 Chopper
7. P-J Control

R
0 None
1 Scarification
2 Terracing
3 Scalping
4 Brush/Grass Ctl
5 Hardwood control
6. Livestock Exclusion

S
0 None
1 Pre Comm Thin
2 Comm Thin
3 Fertilization
4 Species Conversion
5 Brush Hand Ctl
6 Genetic Improve
7 Mortality Salv
8 Irrigation
9 Cleaning and Restocking

⓪ Office entry
① See special instructions

GPO 459-765

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

Date

Instructions on reverse

COMPARISON AREA DATA
(EXTENSIVE ANALYSIS) SSF – GROUND COVER

1. State	2. District			3. Planning Unit	
4. Watershed	5. Location	TOWNSHIP	RANGE	SECTION	MERIDIAN
		– – –	– – –	– – ¼ – – ¼	– –

6. Treatment and common name

7. Acres *(no.)*	8. Major vegetative type *(aspect)*

9. Soil series or phase, if available
(If not, complete Item 10a and b, below)

10a. Surface Conditions – *Consistency* – Moist ☐ Loose ☐ Friable ☐ Firm
Wet ☐ Nonsticky ☐ Sticky
Vesicular layer, ☐ Yes ☐ No
and thickness ☐ 1" ☐ 1–2" ☐ 2–4"
Distance between rocks ☐ 0.1'–2.5' ☐ 2.5'–5' ☐ 5'+

Soil texture ¼"–4" / 4"+	11. ERD – – "	12. Exposure ☐ N ☐ E ☐ S ☐ W ☐ F	13. Slope *(%)* – – –

14a. Precipitation *(annual)* – – –	b. Month J– – – F– – – M– – – A– – – M– – – J– – – J– – – A– – – S– – – O– – – N– – – D– – –

15. Surface Flow ☐ Onsite ☐ Run-in ☐ Run off ☐ Run through	16. PC – – – – lb/ac/yr

17. FIELD DATA

TRANSECT NUMBER (a)	DATE (b)	GROUND COVER: VEGETATION (c)	LITTER (d)	ROCK: SMALL (e)	ROCK: LARGE (f)	BARE GROUND (g)	SSF (h)
– – – – – – – –	– – – –	– – –	– – –	– – –	– – –	– – –	– – –
AVERAGE							

Form 7310–18 (May 1973)

VI. Public Domain Extensive Forest Inventory Master File

The Public Domain Master File is a computer tape file developed for the storage of the following data:

1. Field location (plot),
2. Photo interpretations (associated with field plots),
3. Location observation worksheet,
4. Individual tree computations,
5. Plot summary computations, and
6. Management and timber harvest classifications.

The three individual files--photo point, field plot, and location observation--are combined into a 632-character length record for each tree and/or point recorded on the field plot sheets. An average inventory unit consists of approximately 10,000 individual tree records and up to 5,000 nonstocked point records.

The following data file layout sheets (p. 25-31) show the item recorded, character size and type, position on the master file, and control record number. Each of the items recorded, computed, or developed from external programs is explained in detail on a separate form called a Control Sheet. The DSC Forester maintains the documentation of nearly 400 control sheets. Documentation terminology is being recorded in the BLM Strategic Plan, Detailed Requirements Dictionary (DRD), as time permits.

Each of the items listed in abbreviated form on the layout sheet must be identifiable as a unique name when extracting individual tree or plot data via the REX or other extract program.

A. Master File Update Program

Program L240 produces a master file tape, 632 characters in length per tree record, which is a consolidation of the following data: (1) photo identification, (2) field location ground truth, (3) field observation location worksheet, (4) computations, and (5) timber management and harvest classification. Table I (page 32) lists tape numbers held in permanent storage at the DSC computer center.

The revision of volume equations, initial entries in harvest codes, bark growth factors, field plot expansion factors, etc., is presently reserved for the Denver Service Center. This is a safety precaution which protects the original file from inadvertent changes that may remain undetected and cause erroneous summaries to be produced from the data on file.

1. L240XX: P.D. Forest Inventory System.

Modifies the L240 MTI tapes by adding bark growth factors, field plot expansion factors, and volume equations for each species. Five separate volume calculations are made for each measurable tree, using International, Scribner and cubic volume log rules. Actual tree growth for the past five years is also computed and recorded on the master tape.

Existing gross and net board foot and cubic foot timber volume and growth records of forest stands are perhaps the most important attributes available for developing timber management plans.

Preliminary forest management plans are developed for each of the field plot locations (up to 999 field plots are established in each of the 17 forest inventory units). Timber harvest planning data, multiple-use management codes and multiple-use restriction percentages applied to timber harvesting are also recorded on each of the L240XX versional tapes.

Several tapes of each of the 17 inventory units may be compiled. Each of these versional tapes will have different management planning concepts and proposed timber harvest system codes on file.

The final management plan of each forest inventory unit will be prepared upon completion of the EAR and EIS processes. At that time, the "approved" management plan will be adopted and revised data added to the master tape through the L240 program system.

Optional reports may be printed by program L240XX. These reports, not permanent records, are principally used for displaying, editing proofs, or testing of the formulas and equations to see if they are working correctly.

The master tapes produced through L240XX are used as the information sources for executing the Five Table Field Plot Display Records and other tables used in running the forest simulation modeling program. They are also used as the information sources for creating input tapes into the U.S. Forest Service FINSYS, PROGNOSIS, and other analysis and development systems.

Documentation of some portions of the PD Forest Inventory System is sparce. Individual data elements are defined or explained on Denver Service Center (DSC) Form 1265-23, March 1972, "Data Standard Representation and Code Set." Data element control numbers may be found on the Data File Layout Sheets. This data element file consists of loose leaf notebooks containing over 500 sheets.

Files containing the coded information recorded by photo interpreters are maintained for each unit. Field Plot Establishment Handbooks contain the information needed to decipher the master file codes for data recorded in the field.

Refer to File Code 5216 for the DSC staff publication, "Stratified Double Sampling with Estimated Stratum Weights," for information concerning plot selection stratification statistical analysis, and acreage computations used as plot expansion factors.

DEPARTMENT OF THE INTERIOR
Bureau of Land Management

DSC-1265-26
March 1972

DATA FILE LAYOUT SHEET

GPO 840-675

PROGRAM NAME: P.D. INVENTORY SYSTEM	ID:	PAGE 1 OF 7
FILE NAME: P.D. MASTER	FROM:	TO:
DESCRIPTION (FD MD SD) FD	[X] INPUT [X] OUTPUT	FILE CONTAINS:
ACCESS MODE: SEQUENTIAL	BLOCK: 10 RECORDS	RECORD: 632 Chara.
LABEL: STANDARD	VALUE OF ID: AMFL240	SAVE FACTOR: 999
DATA RECORD (01) MSTR-TREE-NEW	ACTUAL KEY:	
FILE SEQUENCE: TREE-CNTL (ASCENDING)		

LEV	DATA ELEMENT MNEMONIC	INQ. CNTL	PICTURE	POSITION BEG.	POSITION END	SIZE	CONTROL NUMBER
01	MSTR-TREE-NEW	1		001	632	632	
02	TREE-CNTL	2		001	012	12	
04	UNIT-LOC	3		001	005	5	
08	INV-UNIT	4	99	001	002	2	070
08	LOC	5	999	003	005	3	204
04	PNT	6	99	006	007	2	215
04	OCCUP	7	99	008	009	2	236
04	TREE NO.	8	XXX	010	012	3	216
02	PHOTO-INT-DATA	9		013	137	125	
04	SER	10	999	013	015	3	190
04	PI-ADM	11		016	024	9	
08	ST	12	99	016	017	2	101
08	CNTY	13	999	018	020	3	103
08	DIST	14	99	021	022	2	111
08	PLN-UNT	15	99	023	024	2	112
04	SURV-UNT	16	9	025	025	1	102
04	HYDRO	17	99	026	027	2	191
04	RA	18	99	028	029	2	113
04	SUB-BASIN	19	99	030	031	2	
04	RGN	20	999	032	034	3	198
04	CIRCLE	21	9	035	035	1	199
04	ZONE	22	99	036	037	2	166
04	PM	23	99	038	039	2	186
04	PI-PNT-CNT	24	9999	040	043	4	197
04	INTPR	25	9	044	044	1	177
04	PI-MO	26	99	045	046	2	105
04	PI-YR	27	99	047	048	2	106
04	PHOTO-DATA	28		049	059	11	
06	SYMB	29	XXX	049	051	3	181
06	ROLL	30	XXX	052	054	3	182
06	PHOTO	31	XXX	055	057	3	183
06	PI-PNT	32	99	058	059	2	184
04	PNT-CNT-X	33		060	062	3	
06	STND-SIZE	34	9	060	060	1	123
06	STND-STCK	35	9	061	061	1	124
06	FILLER	36	X	062	062	1	
04	PNT-SLD (R)	37	99V9	060	062	3	
04	PNT-NRD (R)	38	999	060	062	3	
04	EASTING	39	9(7)	063	069	7	167
04	NORTHNG	40	9(7)	070	076	7	168
04	LGL-DESC	41		077	088	12	
06	TWP	42		077	081	5	
08	TWP-NO	43	999	077	079	3	187
08	TWP-FRCT	44	9	080	080	1	161
08	TWP-DIR	45	X	081	081	1	162

DEPARTMENT OF THE INTERIOR
Bureau of Land Management

DSC-1265-26
March 1972

DATA FILE LAYOUT SHEET

GPO 841-613

PROGRAM NAME: P.D. INVENTORY SYSTEM	ID:	PAGE 2 OF 7
FILE NAME: P.D. MASTER	FROM:	TO:
DESCRIPTION (FD MD SD) FD	[X] INPUT [X] OUTPUT	FILE CONTAINS
ACCESS MODE: SEQUENTIAL	BLOCK: 10 RECORDS	RECORD: 632 Chara.
LABEL: STANDARD	VALUE OF ID: AMFL240	SAVE FACTOR: 999
DATA RECORD (01) MSTR-TREE-NEW	ACTUAL KEY:	
FILE SEQUENCE: TREE-CNTL (ASCENDING)		

LEV.	DATA ELEMENT MNEMONIC	INQ. CNTL	PICTURE	POSITION BEG	POSITION END	SIZE	CONTROL NUMBER
06	RNG	46		082	086	5	
08	RNG-NO	47	999	082	084	3	188
08	RNG-FRCT	48	9	085	085	1	163
08	RNG-DIR	49	X	086	086	1	164
06	SEC	50	99	087	088	2	189
04	LND-USE	51	99	089	090	2	107
04	DENS	52	99	091	092	2	135
04	CRWN-DIA	53	99	093	094	2	130
04	STND-HGT-X	54		095	097	3	
06	FILLER	55	XX	095	096	2	
06	STND-HGT	56	9	097	097	1	122
04	STND-HGT-9(R)	57	999	095	097	3	
04	PI-VOL	58	S999	098	100	3	194
04	STND-ISOL	59		101	105	5	
06	ISOL-ACRS	60	99	101	102	2	151
06	ISOL-DIST	61	99	103	104	2	151
06	ISOL-TYPE	62	9	105	105	1	151
04	PI-FORS-TYP	63	99	106	107	2	156
04	PI-ASP	64	X	108	108	1	153
04	PI-SLP	65	X	109	109	1	154
04	PI-PHY	66	X	110	110	1	155
04	ELEV	67	999	111	113	3	195
04	TRTMT	68	99	114	115	2	150
04	LND-RESTRCT	69		116	117	2	
08	RESTRCT 1	70	9	116	116	1	160
08	RESTRCT 2	71	9	117	117	1	160
04	SOIL-TYPE	72	XXXX	118	121	4	192
04	MAP-QUAD	73	XXX	122	124	3	165
04	TRAN-ZONE	74		125	126	2	
06	OWNRSHP	75	9	125	125	1	125
06	PI-SINDX (R)	76	X	125	125	1	
06	LOCATN	77	9	126	126	1	126
04	PI-ACRS	78	999V999	127	132	6	109
04	ADJ-FCTR	79	9V9(4)	133	137	5	196
02	FILLER	80	XXX	138	140	3	
02	FIELD-TRTMT	81		141	142	2	
04	TYPE-TRTMT	82	9	141	141	1	
04	YRS-AGO-TRTMT	83	9	142	142	1	
02	FIELD-EDIT-BYPASS	84	X	143	143	1	

DEPARTMENT OF THE INTERIOR
Bureau of Land Management

DSC-1265-26
March 1972

DATA FILE LAYOUT SHEET

GPO 84[illegible]-675

PROGRAM NAME: P.D. INVENTORY SYSTEM	ID:	PAGE 3 OF 7
FILE NAME: P.D. MASTER	FROM:	TO:
DESCRIPTION (FD MD SD) FD	[X] INPUT [X] OUTPUT	FILE CONTAINS:
ACCESS MODE: SEQUENTIAL	BLOCK: 10 RECORDS	RECORD: 632 CHARACTER
LABEL: STANDARD	VALUE OF ID: AMFL240	SAVE FACTOR: 999
DATA RECORD (01) MSTR-TREE-NEW	ACTUAL KEY:	
FILE SEQUENCE: TREE-CNTL (ASCENDING)		

LEV	DATA ELEMENT MNEMONIC	INQ. CNTL	PICTURE	POSITION BEG	POSITION END	SIZE	CONTROL NUMBER
02	AREA-FIELD DATA	85		144	173	30	
04	SMPL-KIND	86	9	144	144	1	205
04	DATE	87		145	150	6	
06	YR	88	99	145	146	2	206
06	MO	89	99	147	148	2	206
06	DA	90	99	149	150	2	206
04	GLU	91	99	151	152	2	208
04	PLOT-FORS-TYPE	92	99	153	154	2	256
04	CALC-FORS-TYPE (R)	93	99	153	154	2	359
04	FIELD-STND-SIZE	94	99	155	156	2	
04	FIELD-STND-AGE	95	999	157	159	3	254
04	BAF	96	99	160	161	2	275
04	BAS	97	999	162	164	3	276
04	FIELD-ASP	98	X	165	165	1	253
04	FIELD-SLP	99	X	166	166	1	246
04	FIELD-PHY	100	X	167	167	1	247
04	SEED-SOURCE	101	9	168	168	1	255
04	AGE-TO-DBH	102	99	169	170	2	245
04	TREE-COUNT	103	999	171	173	3	297
02	TREE-FIELD-DATA	104		174	243	70	
04	AZI	105	999	174	176	3	213
04	DIS	106	99V9	177	179	3	214
04	HIST	107	99	180	181	2	217
04	SPEC	108	999	182	184	3	218
04	DBH	109	999V9	185	188	4	219
04	BARK-THCK	110	99V9	189	191	3	354
04	10YR-RADL	111	S99V9	192	194	3	220
04	AGE-AT-DBH	112	999	195	197	3	237
04	HGT	113	999	198	200	3	221
04	LOGS	114	99V9	201	203	3	223
04	MERCH-HGT	115	999	204	206	3	
04	GRADE	116	X	207	207	1	226
04	SURF	117	99	208	209	2	227
04	CRWN-RAT	118	99	210	211	2	231
04	CRWN-CLSS	119	9	212	212	1	232
04	DAMG	120	99	213	214	2	233
04	SEVERTY	121	99	215	216	2	
04	LOG-DEDS OCCURS 4 TIMES	122		217	236	20	
06	LOG-POSTN	123	99	217	218	2	240
06	TYP-DEDUCT	124	9	219	219	1	241
06	PCT-DEDUCT	125	99	220	221	2	242
04	CLSS	126	99	237	238	2	234
04	SEED-SAPL-CNT	127	99	239	240	2	
04	SITE-NDX	128	999	241	243	3	252

DEPARTMENT OF THE INTERIOR
Bureau of Land Management

DSC-1265-26
March 1972

DATA FILE LAYOUT SHEET

PROGRAM NAME: P.D. INVENTORY SYSTEM | ID: | PAGE 4 OF 7

FILE NAME: P.D. MASTER | FROM: | TO

DESCRIPTION FD MD SD: FD | X INPUT X OUTPUT | FILE CONTAINS

ACCESS MODE: SEQUENTIAL | BLOCK: 10-RECORDS | RECORD 632 CHARACTERS

LABEL: STANDARD | VALUE OF ID: AMFL240 | SAVE FACTOR 999

DATA RECORD (01) MSTR-TREE-NEW | ACTUAL KEY

FILE SEQUENCE: TREE-CNTL (ASCENDING)

LEV	DATA ELEMENT MNEMONIC	INQ. CNTL	PICTURE	POSITION BEG	POSITION END	SIZE	CONTROL NUMBER
02	PLOT-AVGS.	129		244	253	10	
04	AVG-SPEC	130	999	244	246	3	348
04	AVG-SI	131	999	247	249	3	352
04	AVG-YC	132	999V9	250	253	4	347
02	OBSVI	133		254	304	51	
04	HAB-TYP	134	XXX	254	256	3	401
04	STRUCT	135	X	257	257	1	402
04	CANOPY	136	X	258	258	1	403
04	YRS-LOGD	137	XX	259	260	2	404
04	OVR-STK.	138		261	274	14	
06	SPC1	139	XXX	261	263	3	405
06	SPC2	140	XXX	264	266	3	406
06	AGE	141	XXX	267	269	3	407
06	CNPY-CVR	142	XX	270	271	2	408
06	GRW-RATE	143	X	272	272	1	409
06	STMP-YRS	144	XX	273	274	2	410
04	UNDR-STK	145		275	288	14	
06	SPC1	146	XXX	275	277	3	411
06	SPC2	147	XXX	278	280	3	412
06	AGE	148	XXX	281	283	3	413
06	CNPY-CVR	149	XX	284	285	2	414
06	GRW-RATE	150	X	286	286	1	415
06	STMP-YRS	151	XX	287	288	2	416
04	GRND-CVR	152		289	300	12	
06	PCT-BARE	153	99	289	290	2	417
06	PCT-SOD	154	99	291	292	2	418
06	PCT-DBRS	155	99	293	294	2	419
06	PCT-DUFF	156	99	295	296	2	420
06	PCT-LOW	157	99	297	298	2	421
06	PCT-HIGH	158	99	299	300	2	422
04	DNUD-YRS	159	999	301	303	3	423
04	NONSTK-CAUS	160	9	304	304	1	424
02	OBSV2	161		305	377	73	
03	LOC-RATINGS	162		305	370	66	
03	RATINGS OCCURS 3 TIMES	163		305	326	22	
04	RISK	164	9	305	305	1	425
06	MORT	165	9	306	306	1	426
06	INSCT	166	9	307	307	1	427
06	DISEAS	167	9	308	308	1	428
06	ANIML	168	9	309	309	1	429
06	FIRE	169	9	310	310	1	430
06	WEATHR	170	9	311	311	1	431
06	OTHR	171	9	312	312	1	432
06	WILD ANIMAL	172	9	313	313	1	433

DEPARTMENT OF THE INTERIOR
Bureau of Land Management

DSC-1265-26
March 1972

DATA FILE LAYOUT SHEET

GPO 840-675

PROGRAM NAME: P.D. INVENTORY SYSTEM	ID:	PAGE 5 OF 7
FILE NAME: P.D. MASTER	FROM:	TO:
DESCRIPTION (FD MD SD) FD	[X] INPUT [X] OUTPUT	FILE CONTAINS:
ACCESS MODE: SEQUENTIAL	BLOCK: 10-RECORDS	RECORD: 632 CHARA.
LABEL: STANDARD	VALUE OF ID: AMFL240	SAVE FACTOR: 999
DATA RECORD (01) MSTR-TREE-NEW	ACTUAL KEY:	

FILE SEQUENCE: TREE-CNTL (ASCENDING)

LEV	DATA ELEMENT MNEMONIC	INQ. CNTL	PICTURE	POSITION BEG	POSITION END	SIZE	CONTROL NUMBER
06	DGMES-ANML	173	9	314	314	1	434
06	RAPTORS	174	9	315	315	1	435
06	MINING	175	9	316	316	1	436
06	RECREATN	176	9	317	317	1	437
06	OTHR-USE	177	9	318	318	1	438
06	MOVMT	178	9	319	319	1	439
06	SEEPAGE	179	9	320	320	1	440
06	SLUMPS	180	9	321	321	1	441
06	SHEET	181	9	322	322	1	442
06	RILLS	182	9	323	323	1	443
06	GULYS	183	9	324	324	1	444
06	ROCKS	184	9	325	325	1	445
06	STEEP	185	9	326	326	1	446
03	AFFCTD-ACRS	186	999	371	373	3	447
03	EROS-COEFF	187	99	374	375	2	448
03	VIS-IMP-ZONE	188	9	376	376	1	449
03	FILLER	189	X	377	377	1	
02	OBSV3	190		378	409	32	
04	WNDFLS	191		378	381	4	
06	NO-WNDFLS	192	99	378	379	2	450
06	DBH-WNDFLS	193	99	380	381	2	451
04	SNAGS	194		382	385	4	
06	NO-SNAGS	195	99	382	383	2	452
06	DBH-SNAGS	196	99	384	385	2	453
04	NEAREST-RD	197	99V9	386	388	3	454
04	RD-CHNCE	198	9	389	389	1	455
04	RD-OPER	199	9	390	390	1	456
04	INOPER1	200	9	391	391	1	457
04	INOPER2	201	9	392	392	1	458
04	NEXT-CUT-YRS	202	999	393	395	3	459
04	HRVST-METH	203	9	396	396	1	460
04	SLASH-DISPOS	204	9	397	397	1	461
04	PLANT-PREPAR	205	99	398	399	2	462
04	INTENS-MGT	206	99	400	401	2	463
04	HDGED-WLDLIF1	207	9	402	402	1	464
04	HDGED-WLDLIF2	208	9	403	403	1	465
04	HDGED-WLDLIF3	209	9	404	404	1	466
04	HDGED-WLDLIF4	210	9	405	405	1	467
04	NOT-HDGED-WLDLIF1	211	9	406	406	1	468
04	NOT-HDGED-WLDLIF2	212	9	407	407	1	469
04	NOT-HDGED-WLDLIF3	213	9	408	408	1	470
04	NOT-HDGED-WLDLIF4	214	9	409	409	1	471

DEPARTMENT OF THE INTERIOR
Bureau of Land Management

DSC-1265-26
March 1972

DATA FILE LAYOUT SHEET

GPO 840-875

PROGRAM NAME: P.D. INVENTORY	ID:	PAGE 6 OF 7
FILE NAME: P.D. MASTER	FROM:	TO:
DESCRIPTION (FD MD SD) FD	X INPUT X OUTPUT	FILE CONTAINS:
ACCESS MODE: SEQUENTIAL	BLOCK: 10-RECORDS	RECORD: 632 CHARACTERS
LABEL: STANDARD	VALUE OF ID: AMFL240	SAVE FACTOR: 999
DATA RECORD (01) MSTR-TREE-NEW	ACTUAL KEY:	

FILE SEQUENCE: TREE-CNTL (ASCENDING)

LEV	DATA ELEMENT MNEMONIC	INQ. CNTL	PICTURE	POSITION BEG	POSITION END	SIZE	CONTROL NUMBER
02	FIELD-ASP-CONVT	215	9V9	410	411	2	
02	FIELD-PHY-CONVT	216	99	412	413	2	
02	FILLER	217	XXXX	414	417	4	
02	CALC-DATA	218		418	549	142	
04	SITE-YC	219	999V9	418	421	4	351
04	TTL-AGE	220	S999	422	424	3	306
04	AGE-KEY	221	X	425	425	1	
04	AGE-GRP	222	999	426	428	3	355
04	FORM-CLS	223	9V999	429	432	4	353
04	DBH-CLSS	224	9	433	433	1	319
04	SND-BD	225	999	434	436	3	340
04	ROTTEN-BD	226	999	437	439	3	341
04	ROTTEN-CU	227	999	440	442	3	343
04	TREE-STK	228	99V9	443	445	3	320
04	CADI	229	9V9999	446	450	5	356
04	MID-DIA	230	999V999	451	456	6	357
04	TREE-BA-ACR	231	999V999	457	462	6	335
04	TREE-PER-ACR	232	999V999	463	468	6	336
04	PAST-DBH	233	999V99	469	473	5	375
04	BARK-FACTOR	234	9V9999	474	478	5	358
04	CALC-STND-AGE	235	999	479	481	3	332
04	ASSG-STND-AGE	236	XXX	482	484	3	331
04	STND-SIZE-CLS	237	9	485	485	1	330
04	MEAN-STND-DIA	238	999V99	486	490	5	338
04	BA-AC	239	999V99	491	495	5	335
04	AREA-COND	240	99	496	497	2	333
04	MATURA-AGE	241	999	498	500	3	318
04	OVRSTK-CNT	242	99	501	502	2	328
04	UNDSTK-CNT	243	99	503	504	2	329
04	STK-SW	244	9	505	505	1	363
04	DESIR-PCT	245	999V9	506	509	4	321
04	ACCEP-PCT	246	999V9	510	513	4	322
04	CULL-PCT	247	999V9	514	517	4	324
04	NON-STK-PCTS	248		518	532	15	327
06	NONSTK51	249	999	518	520	3	
06	NONSTK60	250	999	521	523	3	
06	NONSTK70	251	999	524	526	3	
06	NONSTK80	252	999	527	529	3	
06	NONSTK54-5	253	999	530	532	3	

DEPARTMENT OF THE INTERIOR
Bureau of Land Management

DSC-1265-26
March 1972

DATA FILE LAYOUT SHEET

GPO 840-675

PROGRAM NAME: P.D. INVENTORY SYSTEM	ID:	PAGE 7 OF 7
FILE NAME: P.D. MASTER	FROM:	TO:
DESCRIPTION FD MD SD: FD	[X] INPUT [X] OUTPUT	FILE CONTAINS:
ACCESS MODE: SEQUENTIAL	BLOCK: 10-RECORDS	RECORD: 632 CHARACTERS
LABEL: STANDARD	VALUE OF ID: AMFL240	SAVE FACTOR: 999
DATA RECORD (01) MSTR-TREE-NEW	ACTUAL KEY:	

FILE SEQUENCE: TREE-CNTL (ASCENDING)

LEV	DATA ELEMENT MNEMONIC	INQ. CNTL	PICTURE	POSITION BEG.	POSITION END	SIZE	CONTROL NUMBER
04	TREE-SEQ	254	999	533	535	3	298
04	EXP-FCTR	255	9(5)V999	536	543	8	365
04	TREES-ACR-5	256	9(5)V999	544	551	8	344
04	TREES-ACR	257	9(5)V999	552	559	8	345
02	HARVST-INFO	258	9	560	566	7	
04	URA-HRVST	259	9	560	560	1	383
04	MFP1-HRVST	260	9	561	561	1	384
04	MFP1-PCT	261	99	562	563	2	385
04	MFP2-HARVST	262	9	564	564	1	386
04	MFP2-PCT	263	99	565	566	2	387
02	GROS-TRE-VOLS.	264		567	626	60	
04	SCRIB-FIX	265	S9(5)V9	567	572	6	367
04	SCRIB-VAR	266	S9(5)V9	573	578	6	373
04	INTL-FIX	267	S9(5)V9	579	584	6	366
04	INTL-VAR	268	S9(5)V9	585	590	6	372
04	CUBIC	269	S9(5)V9	591	596	6	368
04	SCRIB-FIX-GRW	270	S9(4)V99	597	602	6	370
04	SCRIB-VAR-GRW	271	S9(4)V99	603	608	6	374
04	INTL-FIX-GRW	272	S9(4)V99	609	614	6	369
04	INTL-VAR-GRW	273	S9(4)V99	615	620	6	376
04	CUBIC-GRW	274	S9(4)V99	621	626	6	371
	NON-STK-PTS (Cont.)	*248					327
02	NONSTK52	275	999	627	629	3	327
02	NONSTK53	276	999	630	632	3	327

Table I. - TAPE LIST
L240 P.D. FOREST INVENTORY SYSTEM

NO. UNIT NAME	DATE	TAPE	DATE	TAPE	DATE	TAPE
01 - Missoula		11148				
02 - Dillon		8718				
03 - Montrose		11230				
04 - W. Wyoming		10920				
05 - E. Wyoming		10634				
06 - Glenwood Spgs.		4951				
07 - Boise		5026				
08 - King's Range		11021				
09 - Coeur d'Alene		12134				
10 - Canon City		12186				
11 - C. Idaho		8185				
12 - Albuquerque		5301				
13 - Ukiah		6182				
14 - La Pine		8046				
15 - Redding		11663				
17 - E. Oregon		6702				
18 - E. Montana		10737				

Note: Units 15 and 16, Redding, Susanville, Folsom, and Bakersfield Districts have been combined into one SYU, and Unit No. 16 was eliminated.

Files must be at least 5,000 LL in size to hold the data contained on these tapes.

Contact the DSC Forester, D-450, Division of Special Studies, for the tape number containing the latest updates.

B. L240 MODIFICATION RUN PROCEDURE

L240 (SYU) INVENTORY MASTER TREE FILE UPDATE

This program computes volume, growth, and numerous other tree and stand attributes and posts them in their proper fields. In addition, harvest data may be added to the file by merging key-taped harvest and multiple-use restriction alternatives with the master file tapes.

Preparation

A. If harvest data is used in Run, a key-tape should be created.

B. Information required for Run.

1. Harvest key-tape number (if required for Run).
2. Program number for a given unit.
3. Master tape number for that unit.
4. Standard name given that unit.

Run Procedure

A. Dial up computer and log-on terminal.

B. Upon other UMC permission must be granted before accessing A134/CRUN/L240 and A134/CRUN/L240TEX

C. Start job by entering command "CRUN A134/CRUN/L240" Following message will appear:

```
****** CRUN L240 SET PARAMETERS FOR RUNNING L240 JCL ********

 *** SPECIAL NOTE ****
***  IF PROBLEMS OCCUR WHILE ENTERING PARAMETERS FOR JCL ***
***  PRESS THE BREAK KEY TO DROP OUT OF CRUN THEN START OVER **
```

If problems occur, contact User Support Section.

D. Enter your name for banner. This name should be your name or the name of the person job will be produced for.

```
 YOUR NAME FOR BANNER.
==FARRAR
```

E. If harvest key-tape is required, type '$', else type '*'. Upon this request if key-tape used in RUN, enter a dollar sign '$' then the next question will be item F. If no key-tape used, enter '*' then the next question will be item #G. Example below show a bad response, then a correct response.

```
 IF HARVEST KEY-TAPE REQUIRED, TYPE '$', ELSE TYPE '*'
==9
 ERROR '*' or '$' WAS NOT ENTERED PLEASE RE ENTER
```

```
 IF HARVEST KEY-TAPE REQUIRED TYPE '$', ELSE TYPE '*'
==$
```

F. Enter harvest key-tape number. Example "K473." The key-tape produced at the Denver Service Center will start with "K." Enter tape number assigned.

```
ENTER HARVEST KEY-TAPE NUMBER.  EXAMPLE "K473"
==K477
```

G. Enter program unit number 'L240n' n=1-18. Each inventory unit has a program under L240. Enter the coressponding unit number on L240. Note: L24016 is not valid.

```
ENTER PROGRAM UNIT NUMBER 'L240n' n=1-18
==L24018
```

H. Enter master tape number. This master tape was created by L240; unit 1 tape was created by L2401. The tape that corresponds to the unit being run should be entered.

```
ENTER MASTER TAPE NUMBER
==345
```

I. Enter up to 12 characters for unit name. Enter the appropriate unit name.

```
ENTER UP TO 12 CHARACTERS FOR UNIT NAME
==WOODY ACRE
```

J. Upon completion of item I this message will appear:

```
*******   THAT WAS THE LAST ENTRY FOR RUN OF L240  *******

***  IF YOU ENTERED THE PROPER PARAMETERS KEY IN 'RUN'  **
***          WHEN PROMPT '*' APPEARS ON SCREEN          **
***        ELSE RERUN CRUN IF REQUIRED AS BEFORE.       **
***                                                     **
***        RECORD SNUMB NUMBER AFTER RUN COMMAND        **
```

K. Record the job snumb so you can keep track of your output. Output will be placed in the box output was directed to by use of banner.

SPECIAL NOTE: L240 produces a tape that will be held indefinitely or upon another successful L240 RUN. Record input and output tape number, unit name used on tape, and key-tape number for permanent record.

VII. Report Printing Phase - Five Basic Forest Inventory Tables.

Tables I through V display extensive forest inventory field plot data for each field plot location. Each table is designed to show diverse data or to display summary information in a somewhat different fashion. These five basic tables are briefly described below and are followed by CRUN directions for printing copies of the tables.

A. Table I: Individual Tree Data: L241RF

Table I shows individual tree data or nonstocked point location data on a single line. Nonstocked plots will contain only 10 lines of data (one for each point), while heavily stocked plots may contain up to 150 lines of data (one for each tree recorded).

Individual trees are identified by plot and point number, point occupancy, tree number species, history, class, diameter, and total height. Other tree characteristics include both measured and computed tree statistics. Growth sample stems are identified by an "A" (actual), while nongrowth sample trees are identified by a "P" (projected). Total tree age, radial growth, bark thickness, and bark and wood growth factors of nongrowth sample trees are developed through regression analysis studies.

Table I. Job Control Language and CRUN for L241RF.

Job Control Language and CRUN Listing

```
*OLD A185/JCL/L241JCL,R
*LIST

##N,J
$:IDENT:A185,MOREDOCK
$:OPTION:CBL74
$:SELECT:A134/OBJ/L241OBJ
$:EXECUTE:DUMP
$:LIMITS:50,32K,,45K
$:TAPE9:T1,T1D,,"240TAPE",,AMFL240,,DEN16
$:SYSOUT:L1,ORG
$:ENDJOB


*LIST CRUNL241

##:(240TAPENO?)
OLD A185/JCL/L241JCL,R
SYST
EDIT
RS:/"240TAPE"/:/#1/
B
RS:/,J/
$*$USER=DISPOSITION (PUNCH CARRIAGE RETURN FOR ONLINE, OR ELSE
                     ENTER ",J")?

$*$NULL
DONE
REMC
LIST
COUT *NULL
RUN
COUT
```

Summary

The CRUN for L241RF, Table I, does the following:

1. Reads in the L240 Master File Tape selected for the Inventory Unit.
2. Produces Table I, Individual Tree Data, from the above tape input (1/).

1/ Only those field plot locations that are classified as Productive Forest Land under the Ground Land Use criteria are programmed for printing.

Form

A134/CRUNL241

Responses to CRUN Queries

1. L240TAPE NO? _ _ _ _

   Respond with the L240 Master File Tape Number, such as "12134" (Coeur d'Alene, Idaho: Unit 09).

2. DISPOSITION? _ _

   Respond with "Carriage Return" for online printer or respond with ",J" to monitor the job execution.

```
*JMON "SNUMB"
Normal Termination
```

When ',J' is used to monitor the job execution, you must follow through with the JOUT function to get the report printed; otherwise, jobs not directed to a printer are released within 24 hours. Use the JOUT command as shown.

```
*JOUT "SNUMB"
Function?  DIRECT ONLINE
           or
           EPRINT 06
           - for printing at the remote terminal.
```

NOTE: You must set the line length to 140 characters per line before executing these programs, or the ..INIT subroutine file system can be used. Otherwise the remote terminal will only print a maximum of 80 characters on each line and overlapping will occur.

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
PUBLIC DOMAIN FOREST INVENTORY
INDIVIDUAL TREE STATISTICS

PCN 5216.1-ARFL241
INVENTORY UNIT 09-COEUR D ALENE
FIELD SURVEY DATE 8/ 7/74

PLOT LOCATION 217

TABLE I

POINT NO	OC	TREE-ID-DATA NO	SPP	HI	CL	DBH	HEIGHT TOT	MCH	NO LOGS	SZ CL	SITE INDX	TREE-AGE TOT	K	GRP	STK PCT	DBH-INCR. 10YR	ANNUAL	MIDPOINT 5-YR-DBH	BARK THK	GROFAC	BASAL-AREA /TREE	/.1ACRE	DAMAGE COD	SV	CROWN CL	%	EXTRA SEED/SAP
1	2	290	073	01	10	9.4	83	65	4.0	4	49	108	A	110	2.8	.4	.0437	9.182	.6	1.0933	.481	4.00		2	3	4	
1	1	291	073	01	10	14.2	89	74	4.5	4	53	104	A	100	2.8	.3	.0328	14.036	.9	1.0933	1.099	4.00		2	3	4	
2	2	288	202	01	10	6.8	48	25	1.5	3	37	73	A	70	2.8	.4	.0424	6.588	.4	1.0605	.252	4.00			3	6	
2	1	289	073	01	10	15.3	102	82	5.0	4	63	97	A	100	2.8	.6	.0656	14.972	1.2	1.0933	1.276	4.00		1	2	5	
2	3	902	017	01	10	.1	1		.	1		4	P	5	1.1	.	.	.	.	.	.	.					
2	5	903	017	01	10	.1	1		.	1		4	P	5	1.1	.	.	.	.	.	.	.					
2	6	904	202	01	10	.1	1		.	1		3	P	5	1.1	.	.	.	.	.	.	.					
2	4	905	202	01	10	.1	1		.	1		3	P	5	1.1	.	.	.	.	.	.	.					
3	2	275	202	01	20	5.5	50	23	1.0	3		49	P	50	2.8	.6	.0636	5.182	.3	1.0605	.164	4.00			4	4	
3	3	276	202	01	20	5.5	47	20	1.0	3	34	83	A	80	2.8	.4	.0424	5.288	.3	1.0605	.164	4.00			4	4	
3	1	277	202	99	10	16.9	88	64	4.0	5	67	84	A	80	2.8	1.2	.1273	16.264	1.1	1.0605	1.557	4.00			2	5	
3	4	910	017	01	10	.1	1		.	1		4	P	5	1.1	.	.	.	.	.	.	.					
4	2	270	202	01	10	17.4	100	74	4.5	5		94	P	90	2.8	1.0	.1061	16.870	1.0	1.0605	1.651	4.00			3	5	
4	1	271	202	99	10	25.0	120	95	5.5	5	94	79	A	80	2.8	1.4	.1485	24.258	1.3	1.0605	3.408	4.00			2	6	
4	3	272	202	99	10	17.2	100	76	4.5	5	77	82	A	80	2.8	1.0	.1061	16.670	1.2	1.0605	1.613	4.00			3	5	
4	5	273	202	01	10	11.5	94	72	4.5	4		77	P	80	2.8	.8	.0848	11.076	.7	1.0605	.721	4.00			3	4	
4	4	274	202	01	10	13.3	104	77	4.5	4		86	P	90	2.8	.8	.0848	12.876	.8	1.0605	.964	4.00			3	4	
5	3	282	119	01	10	9.9	89	62	3.5	4		54	P	50	2.8	1.6	.1673	9.064	.3	1.0455	.534	4.00			2	5	
5	2	283	202	99	10	13.9	87	63	3.5	4	69	78	A	80	2.8	1.6	.1697	13.052	.7	1.0605	1.053	4.00			2	5	
5	5	284	202	01	10	11.0	70	46	2.5	4	57	70	A	70	2.8	.8	.0848	10.576	.7	1.0605	.659	4.00			3	4	
5	4	285	202	99	10	10.0	70	47	2.5	4	55	77	A	80	2.8	1.0	.1061	9.470	.5	1.0605	.545	4.00			3	6	
5	1	286	119	01	10	11.5	91	68	4.0	4	57	76	A	80	2.8	1.2	.1255	10.873	.6	1.0455	.721	4.00			2	6	
5	6	287	202	01	10	7.6	61	31	1.5	3	47	79	A	80	2.8	.3	.0318	7.441	.6	1.0605	.315	4.00			3	4	
6	1	251	202	01	10	10.1	77	56	3.5	4		53	P	50	2.8	1.4	.1485	9.358	.6	1.0605	.556	4.00			3	6	
6	2	252	073	01	10	10.6	89	66	4.0	4		70	P	70	2.8	.5	.0547	10.327	.7	1.0933	.612	4.00		1	3	4	
6	4	253	202	01	20	8.4	58	37	2.0	3		50	P	50	2.8	.9	.0954	7.923	.5	1.0605	.384	4.00			4	5	
6	3	254	073	01	20	10.4	78	60	3.5	4		59	P	60	2.8	.5	.0547	10.127	.7	1.0933	.589	4.00		1	3	4	
6	5	915	202	01	10	.1	1		.	1		3	P	5	1.1	.	.	.	.	.	.	.					
7	2	255	073	01	10	16.3	99	77	4.5	5		102	P	100	2.8	.5	.0547	16.027	1.0	1.0933	1.449	4.00			2	4	
7	7	256	202	01	20	5.5	41	20	1.0	3		45	P	40	2.8	.6	.0636	5.182	.3	1.0605	.164	4.00			4	4	
7	6	257	073	01	20	9.4	87	65	4.0	4		65	P	60	2.8	.4	.0437	9.182	.6	1.0933	.481	4.00			3	3	
7	4	258	202	01	20	11.8	72	54	3.0	4		72	P	70	2.8	.6	.0636	11.482	.7	1.0605	.759	4.00			4	4	
7	3	259	202	01	20	13.5	88	64	4.0	4		75	P	70	2.8	1.1	.1167	12.917	.8	1.0605	.994	4.00	72		3	5	
7	1	260	202	01	20	14.2	90	70	4.0	4		70	P	70	2.8	1.3	.1379	13.511	.9	1.0605	1.099	4.00	73		3	6	
7	5	261	073	01	20	9.6	86	62	3.5	4		64	P	60	2.8	.4	.0437	9.382	.6	1.0933	.502	4.00			2	3	

POINT NO	OC	TREE-ID-DATA NO	SPP	HI	CL	DBH	HEIGHT TOT	MCH	NO LOGS	Sz CL	SITE INDX	TREE-AGE TOT	K	GRP	STK PCT	DBH-INCR. 10YR	ANNUAL	MIDPOINT 5-YR-DBH	BARK THK	GROFAC	BASAL-AREA /TREE	/.1ACRE	DAMAGE COD	SV	CROWN CL	%	EXTRA SEED/SAP
8	3	263	202	01	20	9.4	55	34	2.0	4		51	P	50	2.8	1.1	.1167	8.817	.6	1.0605	.481	4.00	78		3	5	
8	1	264	202	01	20	16.7	84	61	3.5	5		87	P	90	2.8	1.0	.1061	16.170	1.0	1.0605	1.521	4.00	72		3	5	
8	5	910	202	01	10	.1	1		.	1		3	P	5	1.1	.	.	.	.	.	.	.					
8	7	911	017	01	10	.1	1		.	1		4	P	5	1.1	.	.	.	.	.	.	.					
8	6	912	017	01	10	.1	1		.	1		4	P	5	1.1	.	.	.	.	.	.	.					
8	8	913	017	01	10	.1	1		.	1		4	P	5	1.1	.	.	.	.	.	.	.					
8	4	914	202	01	10	.1	1		.	1		3	P	5	1.1	.	.	.	.	.	.	.					30
9	1	265	073	01	20	18.4	97	66	4.0	5		111	P	110	2.8	.5	.0547	18.127	1.1	1.0933	1.846	4.00		2	2	4	
9	3	267	073	01	10	15.8	106	86	5.0	4		108	P	110	2.8	.5	.0547	15.527	1.0	1.0933	1.361	4.00		1	2	4	
9	2	268	073	01	10	16.8	103	84	5.0	5		109	P	110	2.8	.5	.0547	16.527	1.0	1.0933	1.539	4.00		1	2	4	
9	4	269	017	01	20	7.6	50	33	2.0	3		58	P	60	2.8	1.5	.1635	6.783	.3	1.0897	.315	4.00			3	7	
10	2	278	119	01	10	13.9	95	68	4.0	4		71	P	70	2.8	1.5	.1568	13.116	.4	1.0455	1.053	4.00			2	5	
10	3	279	202	01	20	10.9	77	57	3.5	4		63	P	60	2.8	1.1	.1167	10.317	.7	1.0605	.648	4.00	72		3	5	
10	4	280	202	01	20	8.8	67	39	2.0	3	55	70	A	70	2.8	.6	.0636	8.482	.7	1.0605	.422	4.00	72		4	5	
10	1	281	119	01	10	18.3	111	93	5.5	5	75	71	A	70	2.8	2.4	.2509	17.046	.7	1.0455	1.826	4.00			2	6	
10	5	906	202	01	10	.1	1		.	1		3	P	5	1.1	.	.	.	.	.	.	.					
10	6	907	017	01	10	.1	1		.	1		4	P	5	1.1	.	.	.	.	.	.	.					
10	7	908	017	01	10	.1	1		.	1		4	P	5	1.1	.	.	.	.	.	.	.					
PLOT TOTAL		53													124.6							156.00					30

B. Table II: Individual Tree Volumes: L239

Individual trees (line items) are identified on Table II exactly as they are on Table I. Table II shows the cruise data as recorded in the field. Tree volumes are computed for Scribner and International 1/8, fixed top and variable top log scales. Cubic volume is also computed for all stems that are 5.0 inches in diameter and larger. Both gross tree volume and net volume per acre are shown. Mortality trees are identified by tree history code. If the mortality tree contains any salvage volume, it is recorded again as a salvage tree. To determine such things as gross mortality volume or number of mortality trees per acre etc., subtract Table IV from Table II data.

Table II. Job Control Language and CRUN for L239.

Job Control Language and CRUN Listing

```
*OLD A185/JCL/L239JCL,R
*LIST

##N,J
$:IDENT:A185,MOREDOCK
$:OPTION:CBL74
$:SELECT:A134/OBJ/L3290BJ
$:EXECUTE:DUMP
$:LIMITS:30,32K,,30K
$:TAPE9:T1,TiD,,"240TAPE",,AMFL240,,DEN16
$:SYSOUT:L1,ORG
$:ENDJOB


*LIST CRUNL239

##;  (240TAPENO?)
OLD A185/JCL/L239JCL,R
SYST
EDIT
RS:/"240TAPE"/:/#1/
B
RS:/,J/
S*$USER=DISPOSITION (PUNCH CARRIAGE RETURN FOR ONLINE, OR
ELSE ENTER ,J)?

$*$NULL
DONE
REMC
LIST
COUT *NULL
RUN
COUT
```

Summary

The CRUN for L239, TABLE II, accomplishes the following activities:

1. Reads in the L240 Master File Tape selected for the inventory unit.

2. Produces TABLE II, Individual Tree Volumes, from the L240 input tape selected.

Form

A134/CRUNL239

Responses to CRUN Queries

1. L240 TAPENO? _ _ _ _ _

   Respond with the L240 Master File Tape Number such as "2911" (Missoula, Montana, Unit 01). This is a 4 or 5 digit number.

2. DISPOSITION? _ _

   Respond with "Carriage Return" for online, main printer; or respond with " ,J" to monitor the job execution.

```
*JMON "SNUMB"
Normal Termination
Direct the computer to print your report at the desired
location

*JOUT "SNUMB"
Function?  LIST
           DIRECT ONL
           or
           EPRINT 06
           - for remote terminal printing.
```

POINT NO	OC	TREE-ID-DATA NU	SPC	HI	CL	DBH	HEIGHT TOT	MCH	NMBR LOGS	FORM CLASS	% DEDUCTION BD-FT SND	BD-FT ROT	CUB ROT	TREES PER ACRE	********** FIXED-TOP GROSS /TREE	FIXED-TOP NET/ ACRE	SCRIBNER VARIABLE-TOP GROSS /TREE	VARIABLE-TOP NET/ ACRE	****** INTERNATIONAL 1/8 ** FIXED-TOP GROSS /TREE	FIXED-TOP NET ACRE	VARIABLE TOP GROSS /TREE	VARIABLE TOP NET/ ACRE	CUBIC FOOT VOLUME GROSS /TREE	CUBIC FOOT VOLUME NET/ ACRE
1	2	290	073	01	10	9.4	83	65	4.0	78.0	0	3	1	8.316	43	344	13	107	70	566	22	181	13.9	114
1	1	291	073	01	10	14.2	89	74	4.5	76.7	8	0	0	3.640	150	501	139	465	202	677	183	611	33.0	120
1	3	901	073	05	20	4.3	36	6	.0	00.0	0	0	0	30.000	0	0	0	0	0	0	0	0	.0	0
2	2	288	202	01	10	6.8	48	25	1.5	78.4	0	0	0	15.873	8	122	0	0	17	268	0	0	5.1	81
2	1	289	073	01	10	15.3	102	82	5.0	77.1	0	0	0	3.135	209	656	199	623	277	868	257	807	43.2	135
2	3	902	017	01	10	.1	1	0	.0	00.0	0	0	0	30.000	0	0	0	0	0	0	0	0	.0	0
2	5	903	017	01	10	.1	1	0	.0	00.0	0	0	0	30.000	0	0	0	0	0	0	0	0	.0	0
2	6	904	202	01	10	.1	1	0	.0	00.0	0	0	0	30.000	0	0	0	0	0	0	0	0	.0	0
2	4	905	202	01	10	.1	1	0	.0	00.0	0	0	0	30.000	0	0	0	0	0	0	0	0	.0	0
3	2	275	202	01	20	5.5	50	23	1.0	89.3	0	0	0	24.390	5	110	0	0	0	0	0	0	3.6	88
3	3	276	202	01	20	5.5	47	20	1.0	86.8	0	0	0	24.390	4	90	0	0	0	0	0	0	3.4	83
3	1	277	202	99	10	16.9	88	64	4.0	74.9	3	0	0	2.569	218	542	213	531	283	705	273	680	44.8	115
3	4	910	017	01	10	.1	1	0	.0	00.0	0	0	0	30.000	0	0	0	0	0	0	0	0	.0	0
4	2	270	202	01	10	17.4	100	74	4.5	75.3	0	0	0	2.423	268	649	262	634	345	837	333	808	53.0	128
4	1	271	202	99	10	25.0	120	95	5.5	74.2	0	0	0	1.174	728	854	717	842	887	1041	868	1020	125.3	147
4	3	272	202	99	10	17.2	100	76	4.5	75.3	0	0	0	2.480	260	645	254	629	336	834	324	803	51.8	128
4	5	273	202	01	10	11.5	94	72	4.5	79.1	0	0	0	5.548	95	528	73	404	138	765	100	555	23.7	131
4	4	274	202	01	10	13.3	104	77	4.5	77.4	2	0	0	4.149	149	604	130	527	205	833	173	701	33.2	138
5	3	282	119	01	10	9.9	89	62	3.5	89.3	0	0	0	7.491	83	624	61	460	122	913	85	638	20.8	156
5	2	283	202	99	10	13.9	87	63	3.5	76.3	0	0	0	3.799	136	518	125	476	186	706	165	628	30.8	117
5	5	284	202	01	10	11.0	70	46	2.5	76.6	0	0	0	6.070	58	354	44	264	87	527	61	369	16.4	100
5	4	285	202	99	10	10.0	70	47	2.5	78.3	0	0	0	7.339	46	340	28	207	72	528	41	300	14.0	103
5	1	286	119	01	10	11.5	91	68	4.0	86.9	0	0	0	5.548	121	671	105	584	168	933	141	781	27.5	153
5	6	287	202	01	10	7.6	61	31	1.5	82.4	0	0	0	12.698	18	234	0	0	34	434	0	0	7.9	100
6	1	251	202	01	10	10.1	77	56	3.5	79.7	0	0	0	7.194	55	395	34	245	84	605	49	353	15.8	114
6	2	252	073	01	10	10.6	89	66	4.0	78.1	0	0	0	6.536	68	444	42	276	103	675	61	396	18.8	123
6	4	253	202	01	20	8.4	58	37	2.0	78.0	0	0	0	10.417	21	223	0	0	38	391	0	0	8.6	90
6	3	254	073	01	20	10.4	78	60	3.5	77.2	0	0	0	6.791	55	374	34	227	85	574	49	329	16.0	109
6	5	915	202	01	10	.1	1	0	.0	00.0	0	0	0	30.000	0	0	0	0	0	0	0	0	.0	0
7	2	255	073	01	10	16.3	99	77	4.5	76.5	0	0	0	2.761	234	647	227	626	306	844	291	804	47.4	131
7	7	256	202	01	20	5.5	41	20	1.0	80.5	0	0	0	24.390	2	54	0	0	0	0	0	0	3.1	76

POINT NO	OC	TREE-ID-DATA NO	SPC	HI	CL	DBH	HEIGHT TOT	HEIGHT MCH	NMBR LOGS	FORM CLASS	% DEDUCTION BD-FT SND	% DEDUCTION BD-FT ROT	% DEDUCTION CUB ROT	TREES PER ACRE	SCRIBNER FIXED-TOP GROSS /TREE	SCRIBNER FIXED-TOP NET/ ACRE	SCRIBNER VARIABLE-TOP GROSS /TREE	SCRIBNER VARIABLE-TOP NET/ ACRE	INTERNATIONAL 1/8 ** FIXED-TOP GROSS /TREE	INTERNATIONAL 1/8 ** FIXED-TOP NET ACRE	INTERNATIONAL 1/8 ** VARIABLE TOP GROSS /TREE	INTERNATIONAL 1/8 ** VARIABLE TOP NET/ ACRE	CUBIC FOOT VOLUME GROSS /TREE	CUBIC FOOT VOLUME NET/ ACRE
7	6	257	073	01	20	9.4	87	65	4.0	78.4	5	0	0	8.316	45	356	14	107	74	586	23	182	14.5	121
7	4	258	202	01	20	11.8	72	54	3.0	76.0	0	0	0	5.270	72	379	59	311	104	549	81	425	19.0	100
7	3	259	202	01	20	13.5	88	64	4.0	76.7	2	0	0	4.024	129	510	117	459	177	700	155	609	29.5	119
7	1	260	202	01	20	14.2	90	70	4.0	76.3	13	0	0	3.640	149	472	138	437	202	639	181	574	33.0	120
7	5	261	073	01	20	9.6	86	62	3.5	78.2	0	0	0	7.968	48	380	18	143	77	616	29	229	15.0	120
8	2	262	073	05	20	11.9	86	66	4.0	77.4	46	0	0	5.181	91	255	73	205	131	367	100	279	22.8	118
8	3	263	202	01	20	9.4	55	34	2.0	73.6	8	0	0	8.316	25	193	11	87	42	320	18	135	9.4	78
8	1	264	202	01	20	16.7	84	61	3.5	74.6	4	0	0	2.630	200	505	196	495	261	659	252	636	41.9	110
8	5	910	202	01	10	.1	1	0	.0	00.0	0	0	0	30.000	0	0	0	0	0	0	0	0	.0	0
8	7	911	017	01	10	.1	1	0	.0	00.0	0	0	0	30.000	0	0	0	0	0	0	0	0	.0	0
8	6	912	017	01	10	.1	1	0	.0	00.0	0	0	0	30.000	0	0	0	0	0	0	0	0	.0	0
8	8	913	017	01	10	.1	1	0	.0	00.0	0	0	0	30.000	0	0	0	0	0	0	0	0	.0	0
8	4	914	202	01	10	.1	1	0	.0	00.0	0	0	0	30.000	0	0	0	0	0	0	0	0	.0	0
9	1	265	073	01	20	18.4	97	66	4.0	75.6	0	0	0	2.167	301	653	297	644	384	831	375	813	58.4	127
9	5	266	073	05	20	8.9	65	47	2.5	76.3	0	0	0	9.259	27	246	0	0	46	423	0	0	10.0	93
9	3	267	073	01	10	15.8	106	86	5.0	77.1	0	0	0	2.939	236	693	226	663	309	909	291	854	47.6	140
9	2	268	073	01	10	16.8	103	84	5.0	76.5	0	0	0	2.599	263	682	255	663	340	884	326	847	52.0	135
9	4	269	017	01	20	7.6	50	33	2.0	76.5	0	0	0	12.698	12	152	0	0	23	295	0	0	6.2	79
10	2	278	119	01	10	13.9	95	68	4.0	84.1	0	0	0	3.799	191	726	182	691	253	963	236	897	39.5	150
10	3	279	202	01	20	10.9	77	57	3.5	78.3	19	0	0	6.173	66	329	48	240	98	489	67	336	17.9	110
10	4	280	202	01	20	8.8	67	39	2.0	80.4	4	0	4	9.479	32	288	0	0	53	479	0	0	11.0	100
10	1	281	119	01	10	18.3	111	93	5.5	82.6	0	0	0	2.191	419	918	413	904	526	1151	516	1129	75.6	166
10	5	906	202	01	10	.1	1	0	.0	00.0	0	0	0	30.000	0	0	0	0	0	0	0	0	.0	0
10	6	907	017	01	10	.1	1	0	.0	00.0	0	0	0	30.000	0	0	0	0	0	0	0	0	.0	0
10	7	908	017	01	10	.1	1	0	.0	00.0	0	0	0	30.000	0	0	0	0	0	0	0	0	.0	0

POINT NO	TREE-ID-DATA OC NO	SPC	HEIGHT HI	CL	DBH	NMBR TOT MCH	LOGS	FORM CLASS	% DEDUCTION BD-FT SND	CUB ROT	CUB RUT	TREES PER ACRE	SCRIBNER FIXED-TOP GROSS /TREE	SCRIBNER FIXED-TOP NET/ ACRE	SCRIBNER VARIABLE-TOP GROSS /TREE	SCRIBNER VARIABLE-TOP NET/ ACRE	INTERNATIONAL 1/8 FIXED-TOP GROSS /TREE	INTERNATIONAL 1/8 FIXED-TOP NET ACRE	INTERNATIONAL 1/8 VARIABLE TOP GROSS /TREE	INTERNATIONAL 1/8 VARIABLE TOP NET/ ACRE	CUBIC FOOT VOLUME GROSS /TREE	CUBIC FOOT VOLUME NET/ ACRE
	017	GRAND FIR												152		0		295		0		79
	073	W. LARCH												6231		4749		8820		6332		1586
	119	W. WHITE PINE												2939		2639		3960		3445		625
	202	DOUGLAS FIR												8938		6788		12309		8932		2476
PLOT TOTAL												745.770		18260		14176		25384		18709		4766

C. Table III: Stand Density and Stocking: L237

Table III displays stocking percent by species and number of trees per acre by size class. The five size classes shown are seedlings, saplings, poles, small sawtimber and large sawtimber. Other data shown on Table III, which applies to the entire plot cluster, includes: physiographic information, aerial photo identification, forest type, average site and yield capability, reforestation data, habitat, and plot expansion factors.

Only nine species can be shown on one sheet (see instructions on Fig. 1); therefore, several sheets may be needed to show all of the species found in some inventory units.

Table III. Job Control Language and CRUN for L237

Job Control Language and CRUN Listing

```
*LIST CRUNL237

##; (KEYTAPENO?,240TAPE?)
OLD A185/JCL/L237JCL,R
SYST
EDIT
RS:/"KEYNO"/;*:/#1/
B
RS:/"TAPENO"/:/#2/
B
RS:/"$"/
$*$USER=IF ACFL237 PRESENT ENTER $ ,ELSE ENTER * ?
$*$NULL
B
RS:/,J/
$*$USER=DISPOSITION(CARRIAGE RETURN FOR ONLINE, OR
                          ELSE ENTER ,J ) ?

$*$NULL
DONE
LIST
REMC
COUT
RUN
COUT

*OLD A185/JCL/L237JCL,
CONTINUE-R
*LIST

##N,J
$:IDENT:A185,MOREDOCK
$:CONVER
$:LIMITS:10,10K
$:TAPE7:IN,A1D,,"KEYNO",,,,DEN5
$:INPUT:LODENS,NLABEL,MBCD,NSER,FIXLNG/14
$:FILE:OT,A28
$:OPTION:CBL74
$:SELECT:A134/OBJ/L237OBJ
$:EXECUTE:DUMP
$:LIMITS:50,32K,,45K
$:FILE:R1,A2R
"$":PRMFL:R1,R,S,A150/DAY"KEYDAY"/"KEYNO"
$:TAPE9:T1,T1D,,"TAPENO",,AMFL240,,DEN16
$:SYSOUT:L1,ORG
$:ENDJOB
```

Summary

The CRUN for L237, TABLE III, does the the following activities:

1. Reads in the L240 Master File Tape.

2. Reads in a species and size class key entry tape.

3. Produces TABLE III, Stand Density and Stocking, for the inventory unit selected. Because of numerous species, some inventory units require more than one Table III.

Form

A134/CRUNL237

Responses to CRUN Queries

1. KEYTAPENO? _ _ _ _

   Enter the Key-Tape Number: (K001)
   Refer to Figure 1 for key entry data input.

2. L240TAPE? _ _ _ _ _

   Enter the Forest Inventory Master File Tape Number such as "8718" Dillon, Montana, Unit 02.

3. Answer Question _

   If ACFL237 is present enter $,
   else enter *?*. See ACFL237 Table __ input format. (1/)

4. DISPOSITION? _ _

   Respond with "Carriage Return" for the printout to be printed on the mainline printer; otherwise, Key in " ,J" to monitor the job execution.

```
*JMON "SNUMB"
Normal Termination
Direct the computer to print Table III at the desired
location.

JOUT "SNUMB"
Function?  LIST
           DIRECT ONLINE
           EPRINT 06
           - for printing at the remote terminal
```

1/ The Table III input layout sheet is shown on page ___. Data for Cards No. 10, 21, and 22 must be entered on a DSC key-tape through the Data Entry Section.

Object File Listing

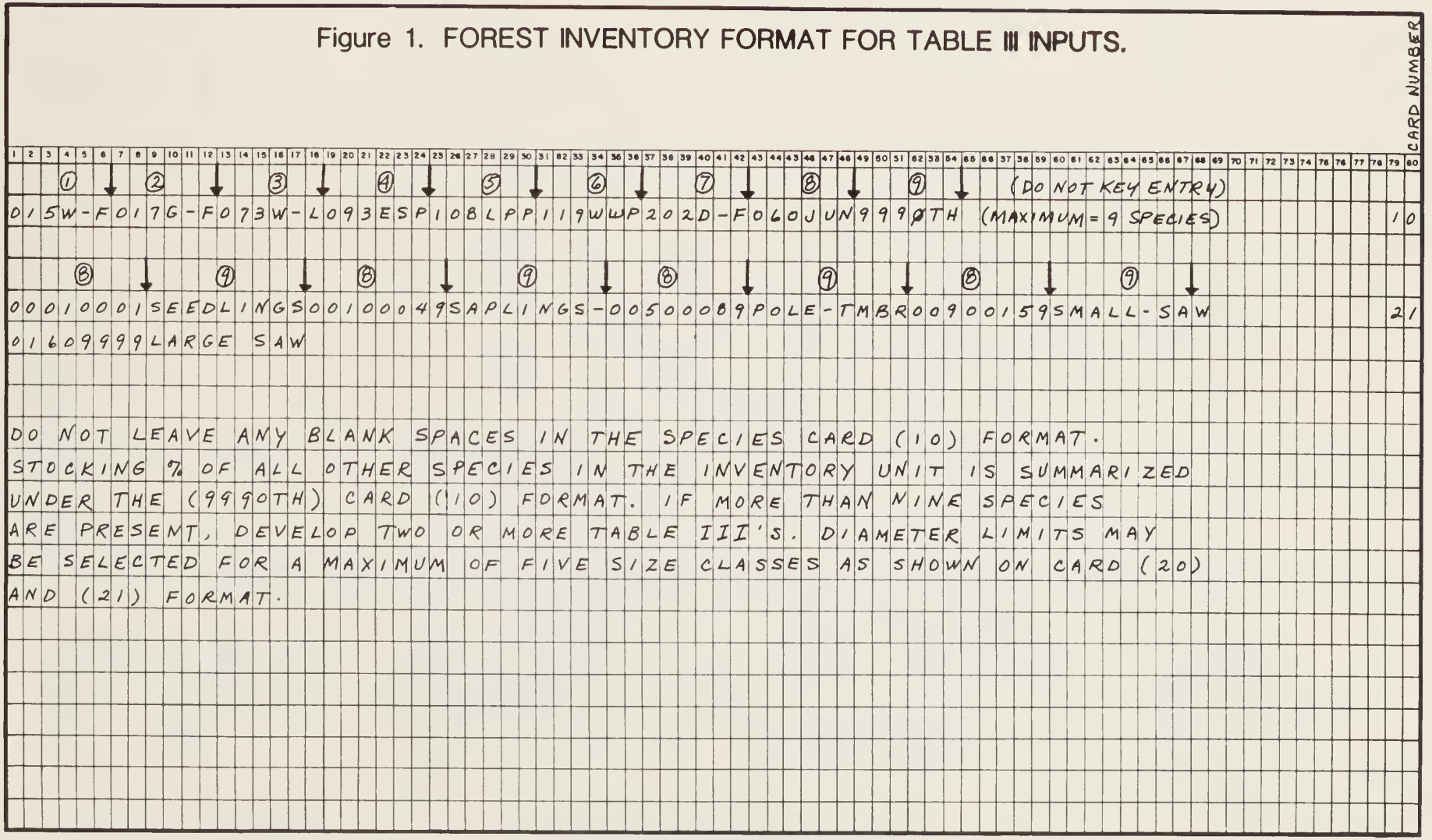
```
*CRUN CRUNL237
KEYTAPENO? K000
240TAPE? 99999
IF ACFL237 PRESENT ENTER $ ,ELSE ENTER * ?*
DISPOSITION(CARRIAGE RETURN FOR ONLINE ELSE ENTER ,J)?,J

*OLD A185/JCL/L237JCL,R
*SYST
*EDIT
-RS:/"KEYNO"/;*:/K000/
END OF FILE - REQUEST EXECUTED    2 TIMES

-B
-RS:/"TAPENO"/:/99999/
-B
-RS:/"$"/
ENTER
**
*
-B
-RS:/,J/
ENTER
*,J
*
-DONE
*LIST

##N,J
$:IDENT:A185,MOREDOCK
$:CONVER
$:LIMITS:10,10K
$:TAPE7:IN,A1D,,K000,,,,DEN5
$:INPUT:LODENS,NLABEL,MBCD,NSER,FIXLNG/14
$:FILE:OT,A2S
$:OPTION:OBL74
$:SELECT:A134/OBJ/L237OBJ
$:EXECUTE:DUMP
$:LIMITS:50,32K,,45K
$:FILE:R1,A2R
*:PRMFL:R1,R,S,A150/DAY"KEYDAY"/K000
$:TAPE9:T1,T1D,,99999,,AMFL240,,DEN16
$:SYSOUT:L1,ORG
$:ENDJOB
```

Figure 1. FOREST INVENTORY FORMAT FOR TABLE III INPUTS.



DSC 1276-1 (Nov. 1976)

PCN:5216.3 (ARFL237)
INVENTORY UNIT 09-COEUR D ALENE
FIELD SURVEY DATE 74/08/07

BUREAU OF LAND MANAGEMENT
PUBLIC DOMAIN FOREST INVENTORY
PLOT SUMMARY - STAND DENSITY & STOCKING

PLOT LOCATION 217

TABLE III (A)

PHYSICAL DATA (FIELD)
ELEV. 28 HUNDRED FEET
ASPECT 1 NORTH
SLOPE 5 46-55 %
PHYSIO. 2 MTN SADDLES.MOIST SLOPE

PHOTO ID DATA (OFFICE)
PHOTO NO. BLM 002 018 06
SOIL TYPE 00AD NOT DEFINED *
CROWN DENSITY 80 %

MISC. PLOT DATA
BASAL AREA STANDARD 138
HABITAT TYPE 400
ABGR/CLUN
PLOT EXPANSION FACTOR 975.638
BASAL AREA FACTOR 40
FOREST TYPE
PHOTO 56-GRND&DGL FIR-L
FIELD/CHP56-GRND&DGL FIR-L

TEN POINT RECAP
NO. POINTS NON-STOCKED - 0
NO. POINTS STOCKED - 8
NO. POINTS OVERSTOCKED - 2

AVERAGE SITE & YEILD
SPECIES 202 DOUGLAS FIR
SITE INDEX 72 50 YEAR BASE
YIELD CAP. 118.7 CU. FT

PERCENT POINTS NONSTOCKED (PER ACRE)
INHIBIT-LOW VEG -
INHIBIT-SLASH/DUFF -
INHIBIT-HIGH BRUSH -
INHIBIT-OVERTOPPED -
BARE-STOCKABLE -
NONSTOCKABLE -
INHIBIT-SOD -

DIAMETER CLASS	AVERAGE DBH	AGE	*** NUMBER OF TREES PER ACRE *** GROWING STOCK	SNO/ROT CULLS	EXTRA TREES	TOTAL TREES	BASAL-AREA GROW STOCK	BASAL-AREA OTHER TREES	***** S T O C K I N G - P E R C E N T - B Y - S P E C I E S ***** 015 W-F	017 G-F	019 A-F	202 D-F	073 W-L	093 E-S	101 WBP	108 LPP	999 OTH	EXTRA TREES	TOTAL TREES
SEEDLINGS																			
.1- .1																			
GROW STCK	.1	4	420.0			420.0				8.8		6.6							15.4
EXTR TREE	.1	3			900.0	900.0												33.0	33.0
SUB-TOTAL	.1	3	420.0		900.0	1320.0				8.8		6.6						33.0	48.4
SAPLINGS																			
1.0- 4.9																			
MORTALITY	4.3	0				30.0		3.0											
SUB-TOTAL	4.3	0				30.0		3.0											
POLE TMBR																			
5.0- 8.9																			
GROW STCK	6.6	63	134.3			134.3	32.0			2.8		19.6							22.4
MORTALITY	6.9	0				9.2		4.0											
SUB-TOTAL	6.8	63	134.3			143.5	32.0	4.0		2.8		19.6							22.4
SMALL SAW																			
9.0-15.9																			
GROW STCK	11.3	72	125.9			125.9	88.0					30.8	22.4				8.4		61.6
MORTALITY	11.9	0				5.1		4.0											
SUB-TOTAL	11.3	72	125.9			131.1	88.0	4.0				30.8	22.4				8.4		61.6
LRGE SAW																			
16.0-99.9																			
GROW STCK	17.7	92	20.9			20.9	36.0					14.0	8.4				2.8		25.2
SUB-TOTAL	17.7	92	20.9			20.9	36.0					14.0	8.4				2.8		25.2
PLOT TTL	4.3	15	701.3		900.0	1685.7	156.0	11.0		11.6		71.0	30.8				11.2	33.0	157.6

PHYSICAL DATA (FIELD)
ELEV. 28 HUNDRED FEET
ASPECT 1 NORTH
SLOPE 5 46-55 %
PHYSIO. 2 MTN SADDLES,MOIST SLOPE

PHOTO ID DATA (OFFICE)
PHOTO NO. BLM 002 018 06
SOIL TYPE 00AD NOT DEFINED *
CROWN DENSITY 80 %

MISC. PLOT DATA
BASAL AREA STANDARD 138
HABITAT TYPE 400
AB R/CLUN
PLOT EXPANSION FACTOR 975.638
BASAL AREA FACTOR 40
FOREST TYPE
PHOTO 56-GRND&DGL FIR-L
FIELD/CMP 56-GRND&DGL FIR-L

TEN POINT RECAP
NO. POINTS NON-STOCKED - 0
NO. POINTS STOCKED - 8
NO. POINTS OVERSTOCKED - 2

AVERAGE SITE & YEILD
SPECIES 202 DDUGLAS FIR
SITE INDEX 72 50 YEAR BASE
YIELD CAP, 118.7 CU. FT

PERCENT POINTS NONSTOCKED (PER ACRE)
INHIBIT-LOW VEG -
INHIBIT-SLASH/DUFF -
INHIBIT-HI H BRUSH -
INHIBIT-OVERTOPPED -
BARE-STOCKABLE -
NONSTOCKABLE -
INHIBIT-SOD -

DIAMETER CLASS	AVERAGE DBH	AGE	*** NUMBER OF TREES PER ACRE *** GROWING STOCK	SND/RDT CULLS	EXTRA TREES	TOTAL TREES	BASAL-AREA GROW STCK	BASAL-AREA OTHER TREES	***** S T O C K I N G - P E R C E N T - B Y - S P E C I E S ***** 119 W-P	122 P-P	242 WRC	263 W-H	264 MTH	376 BIR	746 ASP	747 COT	999 OTH	EXTRA TREES	TOTAL TREES
SEEDLINGS																			
.1- .1																			
GROW STCK	.1	4	420.0			420.0											15.4		15.4
EXTR TREE	.1	3			900.0	900.0												33.0	33.0
SUB-TOTAL	.1	3	420.0		900.0	1320.0											15.4	33.0	48.4
SAPLINGS																			
1.0- 4.9																			
MORTALITY	4.3	0				30.0		3.0											
SUB-TOTAL	4.3	0				30.0		3.0											
POLE TMBR																			
5.0- 8.9																			
GROW STCK	6.6	63	134.3			134.3	32.0										22.4		22.4
MORTALITY	8.9	0				9.2		4.0											
SUB-TOTAL	6.8	63	134.3			143.5	32.0	4.0									22.4		22.4
SMALL SAW																			
9.0-15.9																			
GROW STCK	11.3	72	125.9			125.9	88.0		8.4								53.2		61.6
MORTALITY	11.9	0				5.1		4.0											
SUB-TOTAL	11.3	72	125.9			131.1	88.0	4.0	8.4								53.2		61.6
LRGE SAW																			
16.0-99.9																			
GROW STCK	17.7	92	20.9			20.9	36.0		2.8								22.4		25.2
SUB-TOTAL	17.7	92	20.9			20.9	36.0		2.8								22.4		25.2
PLOT TTL	4.3	15	701.3		900.0	1645.7	156.0	11.0	11.2								113.4	33.0	157.6

D. Table IV: Plot Volumes Per Acre by Size Class: L236

Table IV shows volumes per acre, summarized by the tree size classes--large sawtimber, small sawtimber, and poles. The diameter limits of these size classes are arbitrary and may be changed through program updates. In addition to volumes and number of trees expanded to a per acre basis, such data as location information, land use strata, past treatment, timber stand age, legal description and Mercator projections are shown.

Table IV shows salvage, standing green tree, and mortality tree volumes as line items. However, the mortality volume is excluded from the summary figures. A warning sentence is printed at the bottom of each plot containing mortality data. To obtain the amount of salvage volume, subtract the sum of Table V from the sum shown on Table IV.

Table IV. Job Control Language and CRUN for L236.

Job Control Language and CRUN Listing

```
*OLD A185/JCL/L236JCL,R
*LIST

##N,J
$:IDENT:A185,MOREDOCK
$:OPTION:CBL74
$:SELECT:A134/OBJ/L236OBJ
$:EXECUTE:DUMP
$:DATA:D1
$:LIMITS:50,32K
$:FILE:Ri,NULL
"$":PRMFL:R1,R,S,A150/DAY"KEYDAY"/K"KEYNO"
$:SELECT:A185/CONGTBLE
$:SELECT:A185/HYDROREG
$:SELECT:A185/MAP-QUAD
$:SELECT:A185/PD-TBLIV
$:SELECT:A185/PI-STRAT
$:TAPE9:T1,T1D,,"TAPENO",,AMFL240,,DEN16
$:SYSOUT:L1,ORG
$:ENDJOB

*LIST CRUNL236

##; (KEYDAY?,KEYTAPENO?,240TAPE?)
OLD A185/JCL/L236JCL,R
SYST
EDIT
RS:/"KEYDAY"/:/#1/
RS:/"KEYNO"/:/#2/
B
RS:/"TAPENO"/:/#3/
B
RS:/"$"/
$*$USER=IF ACFL236 PRESENT ENTER $ ,ELSE ENTER * ?
$*$NULL
B
RS:/,J/
$*$USER=DISPOSITION(CARRIAGE RETURN FOR ONLINE,
ELSE ENTER ,J ) ?

$*$NULL
DONE
LIST
REMC
COUT
RUN
COUT
```

Summary

The CRUN for L236, TABLE IV, accomplishes the following activities:

1. Reads in the L240 Master File Tape.

2. Reads in an optional card file (ACFL236) which contains diameter size class limitations.

3. Produces a printout of TABLE IV, Volumes Per Acre, for the inventory unit selected.

Form

A134/CRUNL236

Responses to CRUN Queries

1. KEYDAY? _ _ _ _ _ _

   Respond with an asterisk (*) if the diameter size class limitations shown on the attached Table IV format are satisfactory. Otherwise, key in the Keyday as shown on the verified input forms.

2. KEYTAPENO? _ _ _ _

   Respond with an asterisk (*) as described in #1 above, or enter the new Key-Tape Number.

3. L240TAPENO? _ _ _ _ _

   Respond with the L240 input tape number for the inventory unit.

4. IF ACFL236 Present Enter $, Else Enter *? _ _

   Respond with an asterisk (*) if the diameter size class limitations shown on the attached Table IV format are satisfactory. If optional card file ACFL236 is present, enter the dollar sign ($).

5. DISPOSITION? _ _

   Respond with "Carriage Return" for the printout at the mainline printer. Respond with " ,J" to monitor the job execution.

```
*JMON "SNUMB"
Normal Termination
Direct the computer to print your report at the desired
location.

*JOUT "SNUMB"
Function?  LIST
           DIRECT ONLINE
           or
           EPRINT 06 for remote terminal printing
```

LOCATION-DATA		LAND-USE-DATA		STAND-AGE		LEGAL-DESCRIPTION	
STATE	11-IDAHO	P.I. STRATA	32-D=61-99 H=81-1	FIELD	100 YEARS	MERIDIAN	00-
DISTRICT	06-COEUR D ALEN	FINAL GLU	20-COMMERCIAL FL	COMPUTED	70 YEARS	TOWNSHIP	48.0 N RANGE 1.0 W
COUNTY	055-KOOTENAI	RESTRICTIONS		ASSIGNED	080 YEARS	SECTION	20
RESOURCE AREA	00-EMERALD EMPI	0 -		AGE-TO-DBH	7 YEARS	UNIV.-TRANSVERSE-MERCATOR-PROJ.	
PLANNING UNIT	02-ROCHAT	0 -				ZONE 11	
HYDRO REGION	41-COLUMBIA	PAST TREATMENT		STAND-SIZE-CLASS		NORTHING	525,968
SUB-BASIN	00-UP COLUMBIA	P.I. 00-DISEASE KILLED		FIELD EST.	0 INCHES	EASTING	53,805
MAP NAME	611-NOT DEFINED	FIELD 71-0-5 YRS		CALC DBH 5 <	10.0 INCHES	OWNERSHIP = 0- BLM PD LAND	

DIAMETER CLASS	AVERAGE DBH	AGE	** NUMBER-OF-TREES-PER-ACRE ** GROWING STOCK	SND/ROT CULLS	EXTRA TREES	TOTAL TREES	BASAL-AREA GROW OTHER	STCK TREES	** SCRIBNER-DECIMAL-C ** FIXED-TOP GROSS	FIXED-TOP NET	VARIABLE-TOP GROSS	VARIABLE-TOP NET	** INTERNATIONAL 1/8 ** FIXED-TOP GROSS	FIXED-TOP NET	VARIABLE-TOP GROSS	VARIABLE-TOP NET	** CUBIC ** MIN.SIN-DBH GROSS	MIN.SIN-DBH NET
SEEDLINGS 000.1-000.9																		
GROW STOCK	.1	4	420.0															
EXTRA TREES	.1	3			900.0													
SUB - TOTAL	.1	3				1320.0												
SAPLIN S 001.0-004.9																		
MORTALITY	4.3	0				30.0		3.0										
SUB - TOTAL	.0	0																
POLE TIMBER 5.0- 8.9																		
GROW STOCK	6.6	63	134.3				32.0		1284	1272			1886	1866			699	695
MORTALITY	8.9	0				9.2		4.0	246	246			423	423			92	92
SUB - TOTAL	6.6	67				134.3	32.0		1284	1272			1886	1866			699	695
SMALL SAW 9.0- 15.9																		
GROW STOCK	11.3	72	125.9				88.0		10649	10388	8201	8002	15312	14935	11100	10889	2609	2668
MORTALITY	11.9	0				5.1		4.0	472	254	378	204	677	365	510	278	118	118
SUB - TOTAL	11.3	75				125.9	88.0		10649	10388	8201	8002	15312	14935	11100	10889	2609	2668
LARGE SAW 16.0- PLUS																		
GROW STOCK	17.7	92	20.9				36.0		6132	6095	6004	5967	7834	7784	7586	7539	1186	1186
SUB - TOTAL	17.7	92				20.9	36.0		6132	6095	6004	5967	7834	7784	7586	7539	1186	1186
PLOT TOTAL	4.2	15	701.3		900.0	1601.3	156.0		18066	17755	14206	13970	25032	24586	18747	18428	4556	4551

DETAIL LINE (DEAD-SALV OR MORTALITY) PRINTED / PLOT TOTALS FOR TABLES IV AND V MAY NOT BALANCE / SEE INSTRUCTIONS

E. Table V: Stocking and Volume Per Acre By Age Class: L238

Volume, number of trees per acre, stocking percent, and basal area data from live standing green trees are displayed on Table V by 10 year age classes, from 10 to 400 years of age. In a pseudographic format, this table shows stand condition according to age class distribution. The general stand condition and existence of various stories by age classes can be visualized. Table V can also be used to select the principal management age when classifying plots according to an even, idealized age class.

Table V. Job Control Language and CRUN for L238

Job Control Language and CRUN Listing

```
*OLD A185/JCL/L238JCL,R
*LIST

##N,J
$:IDENT:A185,MOREDOCK
$:OPTION:CBL74
$:SELECT:A134/OBJ/L238OBJ
$:EXECUTE:DUMP
$:LIMITS:50,32K
"$":PRMFL:R1,R,S,A150/DAY"KEYDAY"/K"KEYNO"
$:TAPE9:T1,T1D,,"TAPENO",,AMFL240,,DEN16
$:SYSOUT:L1,ORG
$:SYSOUT:L2,ORG
$:ENDJOB


*


*LIST CRUNL238

##; (KEYDAY?,KEYTAPENO?,240TAPE?)
OLD A185/JCL/L238JCL,R
SYST
EDIT
RS:/"KEYDAY"/:/#1/
RS:/"KEYNO"/:/#2/
B
RS:/"TAPENO"/:/#3/
B
RS:/"$"/ $*$USER=IF ACFL238 PRESENT ENTER $ ,ELSE ENTER * ?
$*$NULL
B
RS:/,J/ $*$USER=DISPOSITION(CARRIAGE RETURN FOR ONLINE ELSE
                                ,J )?

$*$NULL
DONE
LIST
REMC
COUT
RUN
COUT
```

Summary

The CRUN for L238, Table V, Stocking and Volume Per Acre by Age Class, accomplishes the following activities:

1. Reads in the L240 Master File Tape.

2. Reads in an optional card file (key-tape), ACFL238.

3. Produces a Table V for the Inventory Unit selected.

Form

A134/CRUNL238

Responses to CRUN Queries

1. KEYDAY? _ _ _ _ _ _

   Respond with an asterisk (*).

2. KEYTAPENO? _ _ _ _

   Respond with an asterisk (*).

3. L240TAPENO? _ _ _ _ _

   Key in the L240 Master File Tape number for the inventory unit desired.

4. If ACFL238 Present: Enter $, Else Enter *?_

   Respond with an asterisk (*).

5. DISPOSITION _ _

   Respond with a "Carriage Return" for the printout to be printed on the mainline printer. Respond with a " ,J" to monitor the job execution.

   ```
   *JMON "SNUMB"
   Normal Termination
   Direct the computer to print your report at the desired
   location

   *JOUT "SNUMB"
   Function?  LIST
              DIRECT ONLINE
              or
              EPRINT XX
   ```

AGE GROUP YEARS	STOCKING-PERCENT DESIRE TREES	ACCEPT TREES	CULL TREES	EXTRA TREES	TOTAL TREES	TOTAL NO TREES PER ACRE	BASAL-AREA GROW OTHER STCK TREES	** SCRIBNER DECIMAL C ** FIXED-TOP GROSS	FIXED-TOP NET	VARIABL-TOP GROSS	VARIABL-TOP NET	** INTERNATIONAL 1/8 ** FIXED-TOP GROSS	FIXED-TOP NET	VARIABL-TOP GROSS	VARIABL-TOP NET	** CUBIC ** MIN-.5-DBH GROSS	NET
001-005	15.4			33.0	48.4	1,320.0											
006-015																	
016-025																	
026-035																	
036-045		2.8			2.8	24.3	4.0	53	53							75	75
046-055	5.6	8.4			14.0	57.8	20.0	1560	1540	800	791	2256	2227	1137	1125	524	524
056-065		14.0			14.0	41.9	20.0	1686	1589	779	715	2704	2556	1164	1074	537	537
066-075	14.0	11.2			25.2	56.8	36.0	4304	4207	3416	3340	6078	5944	4497	4398	1061	1057
076-085	22.4	2.8			25.2	65.5	36.0	4439	4419	3688	3668	5966	5941	4787	4763	1077	1077
086-095	5.6	2.8			8.4	9.2	12.0	1791	1757	1687	1655	2372	2326	2185	2143	376	376
096-105	8.4				8.4	9.5	12.0	1847	1803	1754	1713	2447	2386	2274	2220	386	386
106-115	8.4	2.8			11.2	16.0	16.0	2382	2370	2079	2075	3208	3189	2700	2693	516	515
116-125																	
126-135																	
136-145																	
146-155																	
156-165																	
166-175																	
176-185																	
186-195																	
196-205																	
206-215																	
216-225																	
226-235																	
236-245																	
246-255																	
256-265																	
266-275																	
276-285																	
286-295																	
296-305																	
306-315																	
316-325																	
326-335																	
336-345																	
346-355																	
356-365																	
366-375																	
376-385																	
386-395																	
396-405																	
406-+																	
TOTALS	79.8	44.8		33.0	157.6	1,601.3	156.0	18066	17738	14206	13957	25032	24569	18747	18416	4556	4550

VIII. Regression Analysis

A. Polynomial Regressions

Foresters often must make predictions using mathematical equations, tabular listings, and plotted points on graphs for timber stand attributes, such as volume per tree and per acre. These attributes are related to timber stand age, site quality, stand density, and basal area per acre. Other paired combinations often plotted in graphic form are total tree height and age, radial growth and stand density, bark thickness, and tree diameter, etc. When only two variables are involved, the dependent variable is predicted in terms of an independent variable, which is a fixed rate on the horizontal axis of the graph and is generally considered the variable with the least or no measurement error.

Paired observations may have linear, curvilinear, random, or no relationship to each other. Coordinates of small samples are plotted on graph paper to visually determine relationships. Paired data, which appear to straighten out when plotted on semilog or logarithmic paper, show that the curve of y over x is exponential.

An equation that contains the best mathematical fit is developed from the paired observations according to the criteria of least squares. This equation may be a straight line function (first-degree curve), a parabola type of function (second-degree curve), or a sine type of function (third-degree curve). The RUNPOLY program is designed to develop the x and y intercepts and the regression coefficients for paired observations for a maximum of 10 degrees. For all practical purposes, a third-degree equation serves most forestry purposes. Because of memory storage problems, SIMIX volume and growth matrixes use two second-degree equations (for timber stand volumes generated above and below 100 years of age). The form of these two equations is generally as shown in Figure 1, page 64.

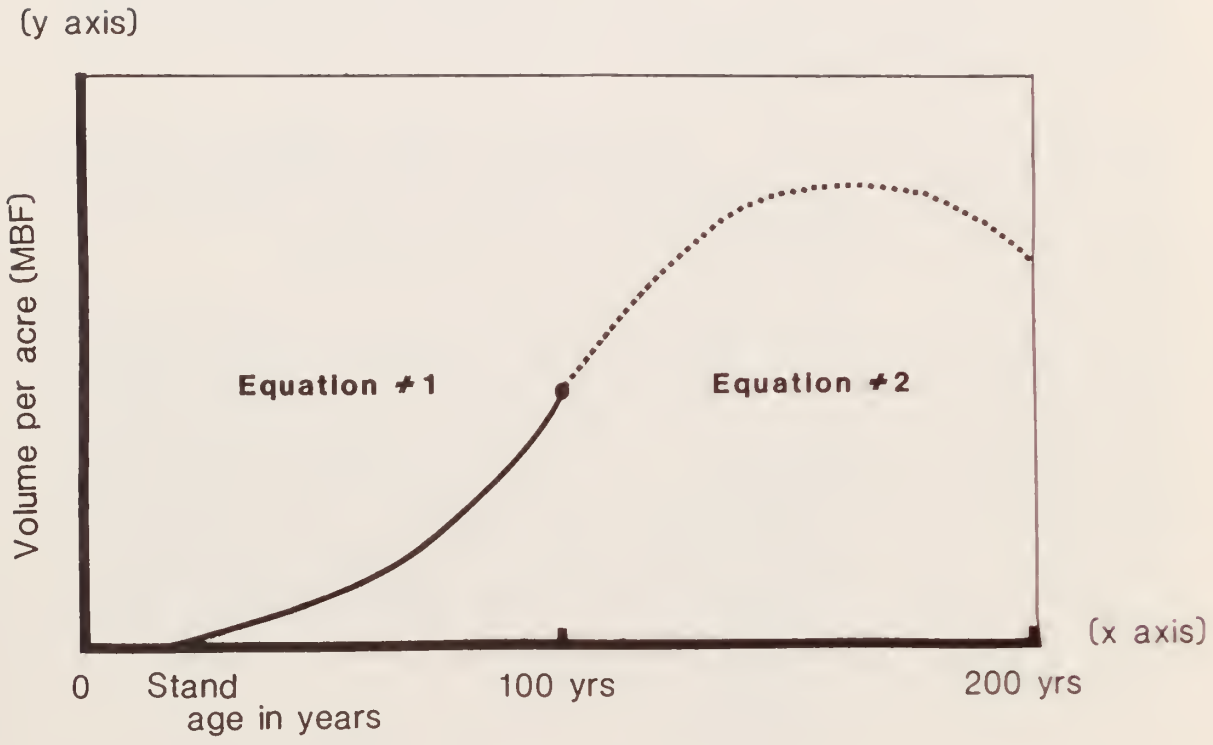


Figure 1. SIMIX yield curve using second-degree equations.

A sample problem has been prepared and run through the polynomial regression program. The inputs and printouts (reports) are available on microfilm. Please refer to the inside title page for the instructions for ordering.

1. Polynomial Regression Execution: A134/RUNPOLY,R

   Execution of these procedures will generate a polynomial regression analysis. To initiate this run, enter a A134/RUNPOLY,R command immediately after an asterisk (*) prompt or after a dash (-) while in the EDIT mode. The /RUNPOLY program is an extract of a portion of the BMD program, University of California, Los Angeles.

2. Response to A134/RUNPOLY Queries

   Enter the appropriate response to the following numbered queries.

   a. General

   (1) ENTER USER IDENTIFICATION. _ _ _ _ _ _

   Type your user identification code and punch the carriage return key.

   Users outside of the Denver Service Center using central computer high speed prints are requested to enter their Mail Code and Name on the $IDENT card along with their UMC (i.e., $ IDENT UMC, MAIL CODE NAME).

   EXAMPLE: $IDENT A000, UT-930 JANE DOE

   This procedure will insure that the listing will be sent to the user in a timely manner. All listings carrying a mail code will be sent out as priority mail.

   Only the first nine spaces following the comma will appear as the banner (letters one-inch high on the first page of the computer printout).

   Upon entering your ID, a second message query will appear.

(2) ENTER CATALOG STRING of INPUT DATA FILE. _ _ _ _ _ _

Type in the name of the data file that contains your problem information. If you are using someone else's file, punch the full file name plus "comma R" for read permission. Refer to the general time-sharing instructions for naming, accessing, editing, and using file storage areas.

Before using a set of file data for the first time, it is generally advisable to print a listing and edit the data on file.

Punch the carriage return key to enter the file name into the program. Another request will appear.

(3) ENTER PROBLEM ID (XX). _ _

Provide a unique, two-character, alphanumeric designation for this regression run.

(4) ENTER TOTAL NUMBER OF CASES ON FILE (NNN). _ _ _

Provide a three-digit, left-zeroed number, less than 999. The "BMD" program can accept up to 2,000 cases.

(5) ENTER DEGREE OF POLYNOMIAL DESIRED (NN). _ _

Provide a two-digit, left-zeroed number which is less than 11.

(6) ENTER NUMBER OF VARIABLES PER RECORD (NN). _ _

A variable is the data in one of the fields of the input such as age, height, diameter, class, etc., which occupy one or more columns. Provide a two-digit, left-zeroed number indicating the number of data elements on each transaction record. The number of data elements must be less than 20 even though there are more than 20 variables on the file you are using. You may use the standard FORTRAN F Statement (Item 9) to skip over unwanted variables. Example: (37X, F3.0, 26X, F5.0, 9X). The computer will only find two variables in each line of 80 columns full of data in this example. Refer to No. 9 below for the FORTRAN statement format.

(7) ENTER POSITION OF INDEPENDENT VARIABLE (NN). _ _

Provide a two-digit, left-zeroed number indicating the columnar section in which the independent variable element is located.

(8) ENTER POSITION OF DEPENDENT VARIABLE (NN). _ _

Provide a two-digit, left-zeroed number indicating the column in which the dependent variable element is located.

(9) ENTER FORM OF INPUT DATA. _ _ _ _ _ _ _ _ _ _ _ _ _ _

Provide a complete FORTRAN F STATEMENT, including parentheses, for key input data. For example: (F3.0, F4.1, F3.0, F1.0, F6.1) represents column headings for species, diameter, height, logs, and volume.

b. Transformations

(1) DO YOU WISH TRANSFORMATION FOR THE DEPENDENT VARIABLE (1=YES 2=NO)? _

If transformations are desired, enter 1; otherwise, enter 2. If transformations are desired, queries B2, 3, 4, and 5 will occur. If not, the queries will skip to C1. The independent variable (X-axis) cannot be transformed.

(2) ENTER NUMBER OF TRANSFORMATION (N). _

Provide a one-digit number indicating the number of separate transformations to be applied to the dependent variable.

(3) ENTER TRANSGENERATION CODE (NN). _ _

See BMD Manual, page 42, for available two-digit transgeneration codes, or the L291 Burroughs Input Form, pages 73 to 74, Figures 2 and 3. (These forms are mainly for sample purposes; however, Card 6 on Figure 3 contains a partial listing of the possible transgeneration codes.) Examples of simple transformations are:

$\bar{y}$, y^c, ln.y, $\frac{1}{y}$, y + constant, etc.

(4) ENTER CONSTANT (NNNNNN): IF NONE, ENTER 6 SPACES

If the transformation identified in query 3 requires a constant, enter a six-digit, left-zeroed number describing that constant. If not, enter six spaces.

(5) ANYMORE TRANSFORMATIONS (1=YES, 2=NO)? _

User must complete the number of transformations specified in Query B2. If additional transformations are required, repeat steps 3 and 4.

(6) Upon completion of the transformation series of queries, the following statement will appear:

THE FOLLOWING SEQUENCE OF REQUESTS WILL ESTABLISH VARIABLE SELECTION CRITERIA.

c. Use of Bounds Cards

Bounds cards may be used to eliminate part of the data file from consideration if it does not meet edit criteria. They can also be used to select only a portion of the data file variables that have been read into the computer program.

For example: A data file consists of tree measurements taken from 50 sample trees. Recorded for each tree are the following five variables:

(1) Tree Number
(2) Species
(3) Diameter
(4) Height
(5) Age

Suppose you wish to plot and analyze diameter (variable No. 3, on the y axis) over total age (variable No. 5, on the X axis). However, the increment borer broke and you were unable to determine the ages of trees Nos. 31 to 50. The tree ages for these 20 trees were left blank. Unless told otherwise, the computer would read the measurements of tree No. 31, for example, as 132 feet tall and zero years of age.

In this example you would use the bounds selection process to include in your equation only those trees whose ages (variable No. 5) are greater than zero. You may make additional demands upon the data file such as: Also, select only those trees that are coded as Douglas firs in the species columns. Example: Variable No. 2 must equal code 202.

Logic is critical in the selection of variable data elements. You cannot make a request such as: Select all Douglas fir and ponderosa pine trees in the file because the computer, being a perfect idiot, will search for a tree that is both species at the same time. This selection must be made in two separate steps and be recorded on two bounds cards.

Enter dummy selection criteria when you wish to use the entire data file, such as: Select all trees less than 00500 feet tall.

Respond to the program queries as they appear:

(1) ENTER VARIABLE NUMBER (NN). _ _

Provide a two-digit, left-zeroed number indicating where the test variable is located.

(2) ENTER TEST FUNCTION CODE (= is 1, Not = 2, < is 3, > is 4). _

Provide the numeric code indicating desired relation test.

(3) ENTER DATA VALUE (NNNNN). _ _ _ _ _

Provide a five-digit, left-zeroed number against which the variable specified in Query C1 will be compared.

(4) DO YOU WISH TO ENTER MORE SELECTION INFORMATION (1 = YES 2 = NO)? _

User may enter up to eight test functions. Multiple test functions are considered as an "and" selection criterion; i.e., all test functions must be satisfied before a record is accepted by the regression program.

(4a) The User can use this variable selection test to ensure that all valid data, or all elements on the file, are included in the regression equation.

(4b) When "no more selection criteria is to be entered" is coded into the /RUNPOLY program, it will proceed to its termination without any further responses.

3. Monitoring Job Execution

After entering the last of the selection codes, and a SNUMB number is received, one may monitor the progress of the run as follows:

```
JMON "SNUMB"
```

When and if this run goes to normal termination, JOUT the number (JOUT "SNUMB") and direct the report to the main site printer (DIRE ONL), or direct it to desired remote printer.

```
*JMON "SNUMB"
Normal Termination
"JOUT "SNUMB"
Function?  List
           DIRE ONL
           EPRINT 06
```

4. Additional Problems

To develop another regression equation, the entire process must be repeated, beginning with the A134/RUNPOLY entry.

5. Reading the Printout

The printout provides the following:

(1) The mean (average) of the x and y inputs.
(2) Correlation coefficient.
(3) Analysis of variance.
(4) Plot (graph) of the input values.
(5) Table of Residuals.

6. CRUN Listing

```
LIST A134/RUNPOLY

##*NULL
OLD A185/JCL/EXPOLY,R
SYST
EDIT CASE
$*$MARK
RS:/IDIDID/
$*$USER= ENTER USER IDENTIFICATION.
$*$NULL
RS:/DDDDD/
$*$USER= ENTER CATALOG STRING OF INPUT DATA FILE.
```

```
$*$NULL
RS:/NN/
$*$USER= ENTER PROBLEM ID (XX).
$*$NULL
RS:/CCC/
$*$USER= ENTER TOTAL NUMBER OF CASES ON FILE (NNN).
$*$NULL
RS:/DD/
$*$USER= ENTER DEGREE OF POLYNOMIAL DESIRED (NN).
$*$NULL
RS:/VV/
$*$USER= ENTER NUMBER OF VARIABLES PER RECORD (NN).
$*$NULL
RS:/IV/
$*$USER= ENTER POSITION OF INDEPENDENT VARIABLE (NN).
$*$NULL
RS:/DV/
$*$USER= ENTER POSITION OF DEPENDENT VARIABLE (NN).
$*$NULL
RS:/FORMAT/
$*$USER= ENTER FORMAT OF INPUT DATA.
$*$NULL
CMOD
$*$MARK
$*$MARK  DO YOU WISH TRANSFORMATIONS FOR THE DEPENDENT
    VARIABLE
$*$USER= (1 = YES, 2 = NO)?
CPOS EQ1;$TRNG
B;1
RS:/TT/:/00/
FS:/SPECTG/
D
CPOS NE1;$SELCT
$*$LBL TRNG
B;1
RS:/TT/:/01/
$*$MARK
RS:/W/
$*$USER= ENTER NUMBER OF TRANSFORMATIONS (N).
$*$NULL
$*$LBL MORE
RS:/WW/
$*$USER= ENTER TRANSGENERATION CODE (NN).
$*$NULL
RS:/WWWWWW/
$*$USER= ENTER CONSTANT (NNNNNN); IF NONE, ENTER 6 SPACES.
$*$NULL
CMOD
$*$USER= ANYMORE TRANSFORMATIONS (1 = YES, 2 = NO)?
CPOS EQ1;$MORE
```

```
RS:/W/;*:/ /
B;3
$*$LBL SELCT
$*$MARK
$*$MARK  THE FOLLOWING SEQUENCE OF REQUESTS WILL ESTABLISH
    VARIABLE
$*$MARK  SELECTION CRITERIA.
$*$LBL CONT
$*$MARK
RS:/XX/
$*$USER= ENTER VARIABLE NUMBER (NN).
$*$NULL
RS:/X/
$*$USER=ENTER TEST FUNCTION (= IS 1, NOT = IS 2, < IS 3, > IS
    4).
$*$NULL
RS:/XXXXX/
$*$USER= ENTER DATA VALUE (NNNNN).
$*$NULL
CMOD
$*$MARK  DO YOU WISH TO ENTER MORE SELECTION INFORMATION
$*$USER= (1 = YES, 2 = NO)?
CPOS EQ1;$CONT
RS:/X/;*:/0/
SYST
COUT NULL
RUN
COUT

*BYE
```

7. Job Control Language

```
*OLD A185/JCL/EXPOLY,R
*LIST

##A,J  ;1
$       IDENT   IDIDID
$       OPTION  FORTRAN
$       SELECT  A134/OBJ/POLYOBJ
$       EXECUTE
$       LIMITS  ,32K
$       PRMFL   08,R,S,DDDDD
PROBLMNNCCCDDO1TT  VVIVDV
FORMAT
SPECTGWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWW
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
FINISH
$       ENDJOB


*
```

Figure 2.

INPUT SHEET
FOR
POLYNOMIAL REGRESSION

BURROUGHS 5500 COMPUTER OBSOLETE FORM Side 1

CARD 1 - Execute Card (B5500 System Card - mandatory)

EXECUTE L291 PRØD 6 Requestor's Initials →

CARD 2 - Data Card (B5500 System Card - mandatory)

%DATA READER . BØSS DATA CARD

Forest Inventory Unit _____

File Designation Section - (check one)

- ○ Data file attached
- ○ Use P.D. Master File - Version no. _____
- ○ Use CIT "FORDATA" Reel no. _____

CARD 3 - Problem Card (mandatory)

PRØBLM A B C D E F G H I J K L M N

A - problem no. (may be alphabetic)
B - no. of cases (max 2,000)
C - degree of polynomial desired (max 10)
D - no. original variables
E - tolerance, if blank is set at 13
F - no. bounds cards (max 9)
G - variable no. of x
H - alpha name of x (independent variable)
I - variable no. of y
J - alpha name of y (dependent variable)
K - "01" if transgeneration of dependent variable desired; else "00"
L - "00" neither plot nor residual desired
"01" plot desired; no residuals
"10" residuals desired; no plot
"11" both plot and residuals desired
M - "3" if using P.D. master file; "7" if CIT
N - number of variable format cards

CARD 4 - Problem Name Card (up to 72 alphanumeric characters - mandatory)

CARD 5 - Variable Format Card (enter standard F-type FORTRAN statement - mandatory)

(over)

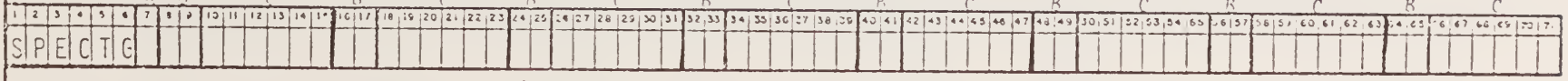
Figure 3.

INPUT SHEET
FOR
POLYNOMIAL REGRESSION

BURROUGHS 5500 COMPUTER OBSOLETE FORM

Side 2

CARD 6 - Special Transgeneration Card for Dependent Variable (y) - (optional)

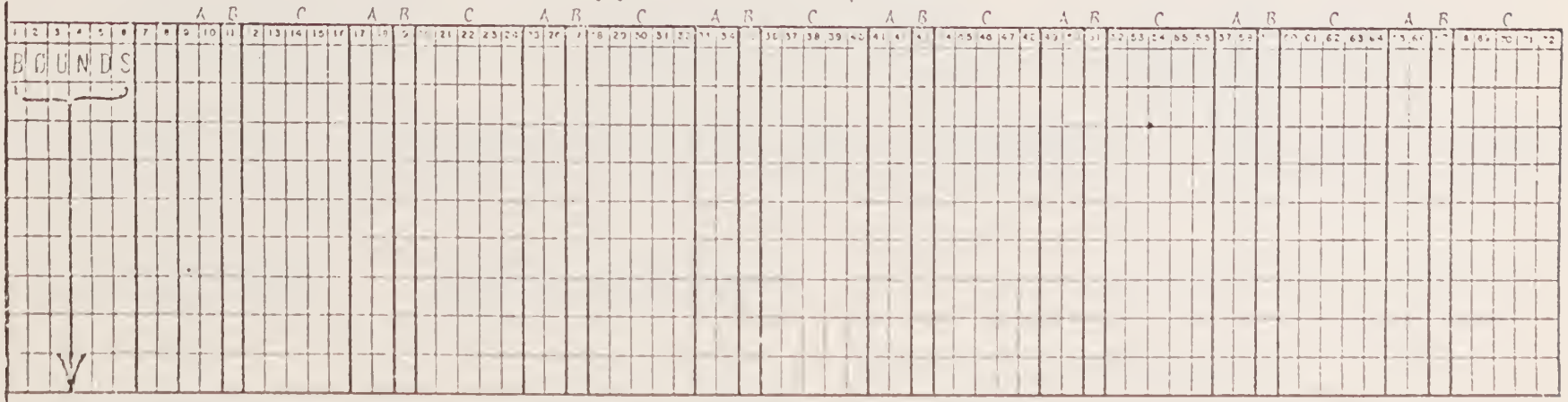


Codes for B:

A - no. of transformations (max 8)
B - code of 1st, 2nd, etc., trangen
C - constant for 1st, 2nd---trangen

01 - $\sqrt{y}$ 03 - log 10y 05 - arcsin$\sqrt{y}$ 07 - 1/y 09 - y.c
02 - $\sqrt{y+1}$ 04 - e^y 06 - arcsin$\sqrt{y/n+1}$+arcsin$\sqrt{(y+1)/(n+1)}$ 08 - y+c 10 - y^c

CARD 7 - Bounds Cards (enter parameters if a portion of file is to be used - optional)



A - Variable Index Number B - Test Function (=, ≠, >, <, ≥, ≤) C - Data Value

CARD 8 - Data Input Cards (insert here if not on tape - max. 2,000)

CARD 9 - End-of-Job Card (mandatory)

NOTE: cards 3 through 8 may be repeated as desired

B. Stepwise Regressions.

The stepwise regression system is used for prediction and optimization of a series of related variables. The stepwise regression procedure is equivalent to solving numerous linear equations simultaneously for numerous unknowns. The dependent variable you may wish to consider may be influenced by two or more independent variables. For example, radial growth or diameter increment of an average tree in the forest stand is dependent upon (1) stand density, (2) length of crown, (3) stand age, (4) species, (5) site quality, and (6) habitat type.

When all other influences are held constant, radial growth is not affected by low stand density because genetic limitations of the species control how fast it can grow. At stand densities over 50 percent, competition for light, moisture, and nutrients begins to prevail, and the growth curve drops in proportion to the increase in stand density. A combination of the six items listed above can be built into an equation which will predict growth under any degree or measurement of the elements listed.

A sample problem (radial growth of forest trees) has been prepared and run through the stepwise regression program at the Denver Service Center. The input data and computer printout have been microfilmed and are available on microfiche. Please refer to the title page for ordering instructions.

This stepwise regression program can be used with excellent results by range, soils, wildlife, and other biological scientists and resource managers to accomplish their duties. Land appraisers and others dealing with dollar values can also analyze the economic significance of a variable such as "distance from town" which affects the total value of the resource being considered.

To save terminal entry time, two data files, with specific names, (1) FILE03 and (2) FILE05 are required. Refer to TSS instructions for creating a file. A Key Entry specialist can enter and edit the data which goes into each of these files. Refer to Figure 4, p. 90, for a sample of the format to be used.

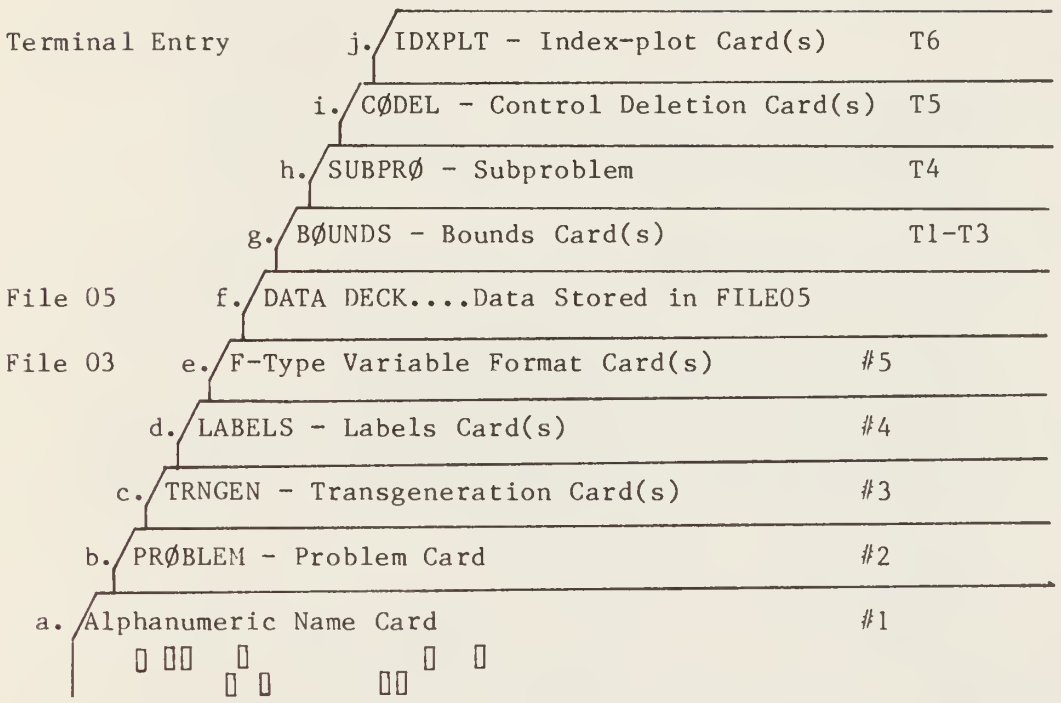
The terminal user needs only to respond to the program queries to operate the stepwise regression program.

A copy of the card deck setup, p. 77, shows the lineup of each of the entry item(s) for FILE03, FILE05, and Terminal Entry inputs.

Because of the interaction between the three input files and the complexity of actions taking place, it is recommended that first-time users read completely through this section and also examine the sample problem that is available on microfilm before attempting to develop their own problem.

The program will ask the user some highly technical statistical questions such as, "F-levels for inclusion and deletion?" and "Tolerance Level?". Use the default values given if in doubt. Refer to any good textbook, such as: Probability and Statistics for Engineers, Irwin Miller and John E. Freund, 1965, Prentiss Hall-Mathematics Series, for a detailed explanation of statisitical terminology.

1. Deck Setup for Stepwise Regression



2. Execution of the Stepwise Regression, Catalog A134/RUNREGR,R
The following instructions describe the procedure for the interactive (terminal batch) execution of the stepwise regression program:

3. Input Data

Data will be loaded into two permanent disc files (/FILE05, /FILE03), and from a terminal.

FILE05 - contains the data you want to run regression analysis on (Fig. 4).

FILE03 - contains title, problem card, label card, and format statement for the data file FILE05. (See sample problems, Figs. 5 and 6).

Key in from terminal - Bounds cards (if any) . . . BOUNDS
Subproblem card . . . . . SUBPRO
Index plot card . . . . . IDXPLT

4. Job Control Language

```
*OLD A185/JCL/STEPREGR,R
*LIST

##N,J
$:IDENT:IIIII
$:OPTION:FORTRAN
$:SELECT:A134/OBJ/REGRSOB
$:EXECUTE
$:PRMFL:03,R,S,FILE03
$:PRMFL:05,R,S,FILE05
$:DATA:04
BBBBBBWWWWWWWWWWWWWWWWWWWWWWWWWWWWWW
BBBBBBWWWWWWWWWWWWWWWWWWWWWWWWWWWWWW
BBBBBBWWWWWWWWWWWWWWWWWWWWWWWWWWWWWW
SUBPROWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWW
CONDELWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWW
IDXPLTWWWWWWWWWWWWWWWWWWWWWWWWWWWWWW
$:LIMITS:25,30K
$:FILE:01,X2S
$:FILE:02,X1S
$:ENDJOB
```

5. Form

```
*A134/RUNREGR,R
```

6. Responses to Program Queries

The stepwise regression program contains a series of general information questions and detailed queries concerning bounds, subproblems, control and index plot card inputs. To avoid input errors, it is advisable to record the input data for FILE03 on a set of blank forms and to list the responses you will wish to make to each of the program queries in order of their appearance.

a. General Information Queries

The stepwise regression program will respond with the following general information queries as soon as you log onto the computer and transmit the program selection code.

(1) ENTER USER IDENTIFICATION. _ _ _ _ _ _

Users outside the Denver Service Center who direct their print request to the central computer high-speed printer are requested to enter their Mail Code and Name on the $IDENT card along with their USER Master Catalog code number.

EXAMPLE: $IDENT A999, UT-930 JANE DOE

All listing carrying a mail code will be sent out as priority mail.

The banner, letters one-inch tall on the first page of the computer report, contains the information recorded in the first nine spaces following the comma of the identification line.

Upon entering your identification, the next program query will appear.

(2) ENTER CATALOG STRING FOR DATA FILE03. _ _ _ _ _

Key in the full name of the catalog-file string for FILE03. This file must contain the following information as shown on the sample problems, Figures 5 and 6.

EXAMPLE: A134/TREES/FILE03

(a) Alphanumeric Problem Name.
(b) Problem Subname.
(c) Transgenerations Used.
(d) Labels for Variables.
(e) FORTRAN F Statement for Data FILE05.

The catalog, subcatalog, file string system allows the user to work on more than one problem at a time. Different FILE03 inputs can be stored under separate, unique, subcatalog names.

Please refer to the Time Sharing System manuals which explain how to create, name, and edit a file if necessary.

Punch the carriage return key to enter the file name.

The next request will appear:

(3) ENTER CATALOG STRING FOR DATA FILE05. _ _ _ _ _

Type and enter the name of the complete catalog-file string of the specific FILE05 which contains the resource data measurements to be used in your regression problem.

It is generally advisable to inspect file contents before executing the /RUNREGR program to insure that all is in order and the F statement is correct for the data to be used. The EDIT program is limited to an

80-character length line of data. The PD Extensive Forest Inventory Master File has a length of 632 characters per tree record. Use the REX or some other extract program to condense large files down to a maximum of 80 characters.

b. Bounds Cards Queries

(1) Is bounds card present?
If it's YES, enter 1; otherwise, enter 2.

(2) Bounds card is deleted?
If Question 1 = 2, key in 1. The query will continue with c.(1).

(3) Enter index of variable (NN).
Provide two-digit numeric (e.g., 01), indicating index of the test variables.

(4) Enter test function (= is 1, > is 2, < is 3, NOT = is 4).
Provide corresponding numeric code.

(5) Enter data value (NNNNN).
Provide five digits, indicate the value of the test function that the variable in FILE05 must satisfy: Use an F 5.2 format for the data value.

(6) Do you have more tests (1=YES, 2=NO)?
If you have more selection criteria, enter 1; otherwise, enter 2.
You can input 4 selection criteria in one card.

(7) Do you have more bounds cards?
If you have more bounds cards, enter 1; otherwise, enter 2.
You can input a maximum of 3 bounds cards.

c. Subproblem Card Queries

(1) Enter index of dependent variable (NN), else enter 2 zeros (Z's).
Enter 2 digits, right justified, filled with zero.

(2) Maximum number of steps (NNN), else enter 3 Z's.
Enter number of steps you desired.

(3) Enter F-level for inclusion (NNNNNN), else enter 6 Z's.
Provide six digits, right justified filled with zero.

(4) Enter F-level for deletion (NNNNNN), else enter 6 Z's. Provide six digits, right justified filled with zero.

(5) Enter tolerance level (NNNNNN), else enter 6 Z's. Provide six digits, right justified filled with zero.

(6) Enter number of variables (NN) on Index Plot Card, else enter 2 Z's. Provide number of variables on the Index Plot card ($0 < i \leq 30$), right justified filled with zero.

(7) Enter YES if control-delete cards are included (NNN), else type 3 Z's.

(8) Enter YES if list of residuals to be printed, or else enter 3 Z's.

(9) Enter YES if summary table to be printed, else enter 3 Z's.

d. Control-Delete Card (CONDEL) Queries

(1) Does control-delete card exist? (1=YES, 2=NO).
If control-delete card exists, enter 1; otherwise, enter 2.

(2) Control card is deleted?
If Question d.1. is 2, enter 1. Query will continue with Question e.1.

(3) Enter control value (N), else enter a zero.
Enter C-D value.

(4) More control value.
If it's YES, enter 1; otherwise, enter 2.

e. Index Plot Cards (IDXPLT) Queries

(1) Enter index of the variable to be plotted, else enter 2 Z's.
Enter index of the variable (right justified with zero filled).

(2) More variable to be plotted.
If it's YES, enter 1; otherwise, enter 2.

When a 2 is entered, the program assumes no more inputs are forthcoming and will proceed to completion of the problem.

NOTE: The test queries of a bounds card is an "and" function. Each of the four tests allowed must be compatible with each other. Also, the replies to bounds cards 2 and 3 queries must not conflict with replies given to bounds card 1.

7. Card Preparation. (From BMD Biomedical Computer Programs, University of California, Los Angeles, California)

Preparation of the cards listed below is specific for this program. Refer to Figures 5 and 6 for sample problem inputs.

a. Name Card (Mandatory). Up to 72 alphanumeric characters may be used to identify this problem.

b. Problem Card.

Col. 1-6 PRØBLM (Mandatory)

Col. 10-15 Alphanumeric problem name

Col. 17-20 Sample size ($1 \leq n \leq 9999$).

Col. 24,25 Number of original variables ($2 \leq p \leq 80$).

Col. 29,30 Number of Transgeneration Cards ($0 \leq m \leq 99$).

Col. 34,35 Number of variables added by transgeneration ($-9 \leq q \leq 78$).

Col. 37 Number of bounds cards. Must agree with terminal input data number (max. 3).

Col. 39,40 Tape number if data is on tape ($\neq$ logical 2); otherwise, leave blank.

Col. 44,45 Number of Subproblem Cards (1)

Col. 48,49 Number of variables labeled on Labels Cards. Leave blank if Labels Cards are not used.

Col. 51-53 YES If means and standard deviations are to be printed; otherwise, leave blank.

Col. 55-57 YES If covariance matrix is to be printed: otherwise, leave blank.

Col. 59-61 YES If correlation matrix is to be printed: otherwise, leave blank.

Col. 63-65 YES If zero regression intercept is desired; otherwise, leave blank.

Note: When presence of a constant term in the model (i.e., non-zero intercept) is in question, punch YES in column 63-65 and generate a "constant" variable (i.e., one which is identically equal to 1). As the program treats this "constant" variable like other, its F-to-enter and F-to-remove value will decide whether the constant term (i.e., the coefficient of this "constant" variable) will be used in the model or not.

Col. 68,69 NO If tape specified in Columns 39,40 is not to be rewound before this problem, leave blank if Columns 39,40 are blank or if tape rewind is desired.

Col. 71,72 Number of F-type Variable Format Cards ($1 \leq k \geq 10$).

c. Transgeneration Cards

The term transgeneration is used to include transformations of input variables and creation of new variables prior to the computations performed by the various programs.

Most BMD programs contain transgeneration options in the form described below. Exceptions are noted in the "Limitations" in the individual program writeups. Transgenerations may be performed for any of the BMD programs by the transgeneration programs BMD09S, BMD12S, or BMD13S.

By use of the transgeneration cards, new variables may be created by performing algebraic, trigonometric, exponential, and logarithmic transformations on the original variables. These variables may either replace the old variables or they may be entirely new variables with new numbers. For example, suppose there are two original variables, variable 1 and variable 2. Then a third variable, variable 3, could be created by letting variable 3 be the square root of variable 2. This would require coding "TRNGEN" in columns 1-6 of a control card, the original variable number (2), a transgeneration code for square root operation, and the new variable number (3) according to a specified format. A complete discussion of the transgeneration concept, a list of possible transgenerations, and transgeneration coding instructions are included in subsection B on page 40 of the BMD textbook.

Card Preparation

In the sample problem, variable No. 4 (DBH), is squared and the product is named DBHDBH. This new variable is indexed as variable 12. Transgeneration code No. 10 (x^c), where c = 2 is used in card No. 3.

Col. 1-6 TRNGEN (Mandatory)

Col. 7-9 Variable index k

Col. 10,11 Code from transgeneration list (restricted by availability in particular program)

Col. 12-14 Variable index i

Col. 15-20 Variable index j or constant c

d. Labels Cards

Labels Cards allow the user to substitute alphanumeric names for the usual numeric indices (variable numbers or category designations) which appear on the printed output.

Card Preparation

Col. 1-6 LABELS (Mandatory)

Col. 7-10 The number of the variable (or category, or index) to be named. This number must be right-justified.

Col. 11-16 The corresponding alphanumeric name.
Col. 17-20 The number of another variable

Col. 21-26 The corresponding alphanumeric name

.
.
.

Col. 67-70 The number of another variable

Col. 71-76 The corresponding alphanumeric name (up to 7 per card)

There may be from one to seven pairs of variable numbers and labels on each Labels Card. If desired, only one pair may be specified on each card. However, the total number of labels appearing on all the Labels Cards must equal the number of labels specified on the Problem or Subproblem Card.

It is not necessary to label all the variables. Those labeled may be listed in any order.

Example: Suppose the number of variables to be labeled as specified on the Problem Card is 9. Then the Labels Cards might be punched as:

```
LABELS 10HEIGHT 07WEIGHT 105AGE 003 XI 051 VAR59 0073 X+Y
LABELS 99SEX 0100ANYNAM
LABELS 05STATUS
```

e. Variable Format Card(s) (Mandatory)

Enter the standard F-type FORTRAN statement. The F statement must conform to the data input file and the label cards.

Example: (F 3.0, 2x, F 1.0, F 3.1, F 5.2) Do not leave any
f. blanks when keypunching the F statement.

Data Deck (FILE05)
The data on which you wish to run the regression must be stored in your data file, identified in your catalog file string as FILE05, as the program is presently designed.

It is generally advisable to print an edit listing of your data file in order to inspect the data before running a regression analysis. Use the bounds cards to exclude line items which contain noncompatible data.

g.
Bounds Card(s) (Optional)

The user may select a portion of the file data through the use of bounds cards. Three separate bounds cards are allowed. Each of these has up to four tests that the data must pass to be included in the problem. Use of logic in the selection criteria is critical. For example, if you wish to extract only Douglas fir (code 202) and ponderosa pine (code 122) species to analyze, two bounds cards are required. A tree cannot be both a species 202 and a species 122 at the same time. That is what would be implied if only one bounds card is used.

In response to terminal queries, the number of bounds card inputs must match the number of bounds cards identified in FILE03 on the PROBLEM card.

Dummy, unproductive numbers may be used to bypass the number of bounds cards identified on the PROBLEM card. This is often easier than changing the contents of FILE03, card No. 2.

h. Subproblem Card

Col. 1-6 SUBPRØ

Col. 9,10 Index of the dependent variable

Col. 13,15 Maximum number of steps. This will be $2(p + q)$ if left blank. This is the value of F, not its significance.

Col. 20-25 F-level for inclusion. This will be 0.01 if left blank. This is the value of F, not its significance.

Col. 30-35 F-level for deletion. This will be 0.005 if left blank. This is the value of F, not its significance.

Col. 40-45 Tolerance level. This will be 0.001 if left blank. The tolerance level should not be set lower than .001 on computers with small word sizes such as IBM 360. Use BMDP9R for highly ill-conditioned problems.

Col. 49,50 Number of variables on the Index-Plot Card ($0 \leq i \geq 30$)

Col. 53-55 YES If Control-Delete Cards are included.

Col. 58-60 YES If list of residuals is to be printed.

Col. 63-65 YES If summary table is to be printed.

i. Control-Delete Card (Optional)

Col. 1-6 CØNDEL (Mandatory)

Col. 7 Control value* for first variable

Col. 8 Control value* for second variable

. . .

Col. 72 Control value* for 66th variable

If there are more than 66 variables, continue on another card of the same form, until $p + q$ variables have been specified.

The variable numbers above refer to variables after transgeneration.

*CONTROL VALUES

1. Delete variable (or dependent variable)
2. Free variable
3. Low-level forced variable

. . .

9. High-level forced variable

If no Control-Delete Cards are included, or if a field is left blank on the Control-Delete Cards included in the deck, the value 2 will be assigned if the variable is not the dependent variable and the value 1 assigned if it is the dependent variable.

j. Index-Plot Card (Optional)

Variables specified on this card are plotted against the residuals.

Col. 1-6 IDXPLT (Mandatory)

Col. 7,8 Index of the first variable to be plotted

Col. 9,10 Index of the second variable to be plotted

. . .

Col. 65,66 Index of the 30th variable to be plotted

No more than 30 variables may be plotted per subproblem.

Variables specified refer to the original data after transgeneration.

k. Limitations per problem:

(1) p, number of original variables ($2 \leq p \leq 80$)
(2) q, number of variables added by transgeneration ($-9 \leq q \leq 78$)
(3) p + q, total number of variables ($2 \leq p + q \leq 80$)
(4) s, number of Subproblem Cards ($1 \leq s \leq 99$)
(5) k, number of Variable Format Cards ($1 \leq k \leq 10$)
(6) i, number of variables to be plotted ($0 \leq i \leq 30$)
(7) n, number of cases ($1 \leq n \leq 9999$)
(8) m, number of Transgeneration Cards ($0 \leq m \leq 99$)

When you indicate, in response to the terminal query that there are no more variables that you wish to be plotted, the program will begin its computations. If no errors are found, the regression will continue to normal termination.

8. Monitoring Job Execution

After entering the responses, one may monitor the progress of the run as follows:

```
JMON "SNUMB"
```

When and if this run goes to normal termination, JOUT the number (JOUT "SNUMB") and direct the report to the main site printer (DIRE ONL), or direct it to desired remote printer.

```
*JMON "SNUMB"
Normal Termination
"JOUT "SNUMB"
Function?  List
           DIRE ONL
           EPRINT 06
```

9. Additional Problems

To develop another regression equation the entire process must be repeated beginning with the /RUNREGR entry.

10. Reading the Printout

The printout provides the following:

a. A summary of some input variables
b. Results of the bounds selection criteria
c. Means and standard deviation of each variable
d. Covariance Matrix
e. Correlation Matrix
f. Equations for each step number with multiple R
   Standard error of the estimate
   Analysis of variance
   Variables in the equation
   Variables not in the equation
g. Summary table if requested
h. List of Residuals if requested
i. Plot of residuals vs. the variable as requested

11. Sample Problem

Field Data to be Analyzed Using Stepwise Regression*

Given:

A data file contains the information records of 15 sample trees. The items recorded for each tree are as follows:

(1) Plot number

(2) Species code

(3) Tree class code (desirable, acceptable, etc.)

(4) Diameter at breast height (inches)

(5) Total height (feet)

(6) Total age (years)

(7) Ten-year diameter increment (wood only) (inches)

(8) Bark thickness (inches)

(9) Crown class code (dominant, codominant, tec.)

(10) Crown length (percent of total height)

(11) Basal area per acre (square feet)

*Figure 4 on the following page is the actual field data that must be stored in FILE05.

Figure 4. DIAMETER INCREMENT STUDY - Stepwise Regression.

Copy of field data

Field plot number (1 2 3)	Species code (5 6 7)	Tree class code (9 10 11)	DBH (in.) (13 14 15)	Total height (ft) (17 18 19)	Total Age (yrs) (21 22 23)	Diameter Increment (in.) wood only (25 26 27)	Bark thickness (in.) (29 30 31)	Crown closure (%) (33 34 35)	Crown length (%) (37 38 39)	Basal area (sq ft/ac) (41 42 43)
211	202	10	244	124	190	04	17	2	60	101
211	202	20	264	111	180	08	17	2	40	101
211	202	10	170	86	120	09	09	2	60	101
211	073	20	136	97	130	02	10	2	40	101
211	122	10	271	114	210	08	16	2	60	101
213	093	20	130	79	90	08	07	3	50	201
213	202	10	122	68	70	11	07	3	50	201
213	202	10	158	87	100	06	10	2	50	201
213	202	20	81	57	80	02	05	4	20	201
225	202	10	138	92	90	08	10	3	50	201
230	202	10	120	66	50	25	05	2	60	126
230	122	10	64	44	40	15	03	3	40	126
230	122	20	43	31	40	04	02	4	30	126
230	122	10	68	57	40	14	03	3	60	126
230	202	10	83	66	50	15	04	2	50	126

Problem No. 1

Develop a stepwise equation for predicting diameter increment (growth) of Douglas fir (202) and ponderosa pine (122) species from the sample tree data in your data field.

- Carry the problem out to a maximum of ten steps.
- Make transformations of data if desirable.
- List means and standard deviations.
- Develop a covariance matrix.
- Develop a correlation matrix.
- Develop a summary table of multiple R^2.
- Prepare a list of residuals.
- Plot the five most significant variables.
- Do not include variables in the equation that do not have a biological significance.

* Refer to Figures 5 and 6 for the data to be put in FILE03.

** Refer to the microfiche card for the report (printout) developed through the execution of this problem.

Figure 5. STEPWISE REGRESSION

Input into File No. ... /FILE03.

CARD 1 - Problem Name Card (up to 72 alphanumeric characters - mandatory)

```
STEPWISE REGRESSION--WOOD INCREMENT--10 YEARS--DIA. INCHES
```

CARD 2 - Problem Card (mandatory)

```
     A    B    C    D    F  F  G     H     I  J   K   L   M   N  O
PRØBLM INCREM 0015 11 01 01 2X 01 12 YES YES YES      X  02
```

A - alphanumeric problem name
B - sample size (max 9,999)
C - no. original variables (max 80)
D - no. transgeneration cards (max 99)
E - no. var. added by transgeneration

F - no. bounds cards (max ~~3~~)
~~G - "3" if using P.D. master file; "7" if CIT~~
H - no. sub-problem cards
I - no. variables labeled
J - "YES" if means & standard dev. desired

K - "YES" if covariance matrix desired
L - "YES" if correlation matrix desired
M - "YES" if zero regression intercept desired
~~N - "NO" if data tape not to be rewound~~
Ø - no. of variable format cards

CARD 3 - Transgeneration Cards (optional)

```
     A  B  C  D
TRNGEN 01 2 1 0004 02.000
```

```
TRNGEN
```

$004^2 = DBH^2$

$04^2 = DBH^2$

Selected codes most commonly used transgenerations - See BMD manual for the complete list.

01 - $\sqrt{x}$
02 - $\sqrt{x + T}$
03 - $\log_{10} x$
04 - e^x
07 - $1/x$
08 - $x + c$
09 - $x \cdot c$
10 - x^c
11 - $x_i + x$
12 - $x_i - x_j$
13 - $x_i \cdot x_j$
14 - x_i / x_j
17 - $\log_e x$

A - variable index
B - transgen code
C - variable index i
D - variable index j or constant c

Figure 6. STEPWISE REGRESSION

Input into File No. ... /FILE03.

CARD 4 - Label Cards (enter 6 character name for each variable read and transformed - optional)

```
LABELS
Y
```

```
1PLOTNO  2SPECIE  3TREECL  4D.B.H.  5TTLHGT  6TTLAGE  *7*
8BRKTHK  9CRNCLA  10CRNPCT  11BA/ACR  12DBHDBH  13  14
15  16  17  18  19  20  21
```

Card #4 (LABELS) has been extended to a length of 76 characters.

```
*  *
69 70 71 72 73 74 75 76
   7  W  O  O  D  I  N
14
21
```

CARD 5 - Variable Format Card (enter standard F-type FORTRAN statement (mandatory)

```
(F3.0,1X,F3.0,2X,F2.0,1X,F3.1,1X,F3.0,1X,F3.0,2X,F2.1,2X,F2.1,3X,F1.0,2X
F2.0,1X,F3.0)
```

IX. SIMIX Input Programs

The five programs used for summarizing, consolidating and manipulating acreage and volume data that is used as inputs in the BLM forest simulation modeling system (SIMIX) are described in this chapter. These programs are listed as follows.

-- L260, SIMIX Plot Acreage and Volume Summaries.

-- L261 and L262 (Combined = L2612)
Tree Data Reports: L264
Polynomial Regression of Plot Age and Volume: L262
These reports can also produce individual tree growth records and a polynomial regression equation of plot growth and plot age.

-- L263, Curve Harmonizer Program.

-- L248, Multiple-Use Factor Program.

Field plot classification data, in conformance with URA or MFP harvest classification systems, must be recorded on the Field Plot Master File before these programs can be executed.

The extensive inventory master tree file may show a biologically perfect aspen tree as a tree class No. 10, "Desirable Tree." In addition, cubic foot volume is computed for all trees 5.0 inches in diameter and larger, and board foot volume is computed for trees 6.0 inches in diameter and larger. Aspen trees are not considered as a merchantable species throughout most of the Rocky Mountain States.

Programs L260 and L261 contain provisions for selection and/or exclusion of specific tree species and classes, diameter classifications, URA and MFP harvest classifications, and multiple-use restrictions in the compilation of plot summaries and regression equations.

State Directors and District Managers set the standards for species merchantability and minimum diameter limits by species for trees to be included in the allowable cut alternatives. Programmers must be provided a listing of these standards so that they can hard code the selection criteria for species and size merchantability into programs L260, L261, and L262.

A. SIMIX Plot Acreage and Volume Summary Program: L260

1. Execution of CRUN L260

The SIMIX Plot Summary Program develops forest acreages by age classes and harvest codes for Scribner and International board foot and cubic foot utilization standards. Existing timber volume is shown per plot (acre) and for the expanded age class strata. Site quality by field plot location, age classes, and harvest regimes is also computed.

2. CRUN Listing for L260

```
*LIST CRUN L260

##;(MSTRTAPE?)
OLD A185/JCL/L260JCL,R
SYST
EDIT
RS:DATACRD1/
$*$USER=ENTER DATA CARD1?
$*$NULL
RS:/2NDDATA2/
$*$USER=ENTER DATA CARD2?
$*$NULL
RS:/2NDDATA3/
$*$USER=ENTER DATA CARD2?
$*$NULL
RS:/2NDATA4/
$*$USER=ENTER DATA CARD2?
$*$NULL
RS:/MSTRTAPE/;*:/#1/
B
RS:/,J/
$*$USER=DISPOSITION(CARRIAGE RETURN FOR ONLINE, ELSE ENTER ,J)?
$*$NULL
DONE
LIST
REMC
COUT
RUN
COUT
```

3. Job Control Language for L260

```
*OLD A185/JCL/L260JCL,R
*LIST

##N,J
$:IDENT:A185, MOREDOCK
$:OPTION:COBOL
$:SELECT:A134/OBJ/L260OBJ
$:EXECUTE:DUMP"
$:LIMITS:20,20K,,10K
$:DATA:I*R
#DATACRD1
#2NDDATA12NDDATA22NDDATA32NDDATA4
$:TAPE9:T1,X1D,,MSTRTAPE,,AMFL240,,DEN16
$:FILE:S1,,200R
$:FILE:S2,,200R
$:SYSOUT:L1,ORG
$:ENDJOB
```

4. Summary

The CRUN for L260, SIMIX Plot Summary, accomplishes the following activities:

a. Reads in L240 Master File Tape.

b. Reads in two parameter cards which define the report to be produced.

c. Produces a SIMIX, L260, Plot Summary Report.

5. Form

A134/CRUNL260

6. Response to CRUN Queries

a. MSTRTAPE? _ _ _ _ _

Key in the number of the L240 Master File Tape for the inventory unit. This is a four- or five-digit number.

b. ENTER DATA CARD1? _ _ _ _ _ _ _ _ _ _ _ _

Twelve spaces (columns) are available for data entry (see the parameter layout below). Place an X in the appropriate column (1 through 5) for the log-to-lumber conversion rule used. Place an X in the appropriate column (6 through 8) for the harvest code used.

PARAMETER CARD LAYOUT FOR L260

DATA CARD1

COLUMN	LEGEND
1 - SCRIBNER -	FIXED TOP LOG RULE
2 - SCRIBNER -	VARIABLE TOP LOG RULE
3 - INTERNL -	FIXED TOP LOG RULE
4 - INTERNTL -	VARIABLE TOP LOG RULE
5 - CUBIC -	TOP LOG RULE
6 - URA	HARVEST CODE
7 - MFP1	HARVEST CODE
8 - MFP2	HARVEST CODE

c. Data Card #2

Data card #2 has 48 spaces (columns) for direct entry of identification data. The remote terminal will print a prompt message 4 times; only 12 spaces of identification can be filled on each of the four line entries as shown below.

1) ENTER DATA CARD2? _ _ _ _ _ _ _ _ _ _ _ _

Key in the first 12 characters of the identification message. Example: (INV.-UN.-NO.).

2) ENTER DATA CARD2? _ _ _ _ _ _ _ _ _ _ _ _

Key in the second set of 12 characters of the identification message. Example: (13: INTL.-FIX).

3) ENTER DATA CARD2? _ _ _ _ _ _ _ _ _ _ _ _

Key in the third set of 12 characters of the identification message. Example: (.:MSTR#1:MFP).

4) ENTER DATA CARD2? _ _ _ _ _ _ _ _ _ _ _ _

Key in the fourth set of 12 characters of the identification message. Example: (11:CC + PC:--2).
Code (2) must be keyed in column #48 to indicate that this is control card #2.

The entire identification message printed on the L240 Report would be:

INV.-UN.-NO.13:INTL -FIX.:MSTR#1:MFP-1:CC + PC:--2

7. Disposition?

Respond with Carriage Return (CR) to have the L260 Report printed on the main printer.

Respond with ,J to monitor the execution of the job.

```
*JMON "SNUMB"
Normal Termination
*JOUT "SNUMB"
Function:  DIRECT ONLINE
           or
           EPRINT 06
```

8. Sample Report.

Please see pages 99 and 100 for copies of two pages of Report # L260.

X X BOISE UNIT 07 INTER-FIX URA MASTER #3 BATCH 21<PAR80

REPORT DATE 78/05/17 UNITED STATES DEPARTMENT OF THE INTERIOR PAGE NO. 9

PCN 07-ARFL260 BUREAU OF LAND MANAGEMENT BOISE

PLOT STRATIFICATION SUMMARY FOR MANAGEMENT PLAN URA USING INTERNTL-FIXED MEASUREMENT METHOD

HARVEST METHOD: PARTIAL-CUT # 0

ASG AGE	CAL AGE	LUC	SITE NDX	EXPANSION FACTOR	VOLUMES PER PLOT	VOLUMES PER STRATA	GROWTH PER PLOT	GROWTH PER STRATA	
080	050	105	045	444.119	16334.99	7254.68	2466.59	1184.28	
090	060	126	060	426.632	17432.75	7472.23	2223.20	952.93	
100	060	077	058	422.401	18253.91	7710.47	2489.94	1051.75	
100	090	091	053	413.870	21576.91	8930.04	2308.76	955.53	
100	SUMMRY		056	836.271	39830.82	16640.51	4798.70	2007.28	* * * * * * * * * * * * * * * * * * * *
110	100	061	070	424.303	19041.28	8079.27	2090.75	887.11	
110	070	145	080	426.632	27773.04	11904.41	2153.65	923.12	
110	SUMMRY		080	852.935	46814.32	19983.69	4244.40	1810.23	* * * * * * * * * * * * * * * * * * * *
130	080	141	042	426.632	20148.37	8636.24	1248.39	535.10	
160	170	097	054	413.870	21203.52	8775.50	1432.62	592.92	
180	190	114	057	426.632	28740.96	12319.30	1663.85	713.18	
200	210	111	062	426.632	28232.64	12101.41	1358.56	582.32	
200	200	115	065	426.632	49329.65	21144.27	1400.51	600.30	
200	SUMMRY		064	857.264	77562.20	33245.68	2759.07	1182.63	* * * * * * * * * * * * * * * * * * * *
230	220	071	060	422.401	22032.38	9306.50	891.87	376.73	

[FTOT: NOTE = STRATA VOLUME AND STRATA GROWTH ARE SHOWN IN 1000S OF BD.FEET.

HARVEST METHOD: PARTIAL-CUT + 0

AGE GROUP	TOTAL ACRES	VOLUME/ACRE	STRATA VOLUM	GROWTH/ACRE	STRATA GROWTHPLT	SI
N=S	5510.603	688.04	3791.51	71.41	393.52	
010	1256.274	1347.14	1695.07	217.50	273.08	
020	833.971	1069.61	892.02	38.83	32.39	
040	424.303	1589.49	657.45	180.69	78.07	
050	422.401	7396.46	3124.27	1471.49	621.56	
060	1256.372	13608.93	17097.88	2907.27	3652.02	
070	426.032	9687.23	4237.98	1316.92	564.47	
080	444.119	16334.90	7254.68	2666.59	1184.28	
090	426.032	17432.75	7472.23	2223.20	952.93	
100	836.271	19898.46	16640.51	2400.27	2007.28	
110	852.935	23429.32	19983.69	2122.36	1810.23	
130	428.632	20148.37	8636.24	1248.30	535.10	
160	413.870	21203.52	8775.50	1432.62	592.92	
180	428.632	28740.96	12319.30	1663.85	713.18	
200	857.264	38781.15	33245.68	1379.53	1182.63	
230	422.401	22032.38	9306.50	891.87	376.73	

B. SIMIX Tree Data Report and Polynomial Regression of Plot Volume Over Plot Age: L261 and L262: Combined CRUN261-2

1. Program Execution

a. CRUN L261

Program L261 extracts, lists and summarizes individual tree volumes and related data on a per-plot, per-acre, and per-expanded stratum basis. Field plots, with various acreage expansion weights, are adjusted to a common acreage base for each decadal age class.

Parameters for selection of data from certain age classes, ground land-use codes, species, and diameter classes must be hard coded into the program.

b. CRUN L262

Program L262 is a polynomial regression subsystem. Weighted and adjusted timber stand volume per-acre, or actual volume increment for the past five years, are plotted on the Y axis, and timber stand age classes are plotted on the X axis. First- and second-degree polynomial regression equations are computed for either timber yield or timber growth as requested.

Program L262 produces a report that shows the following:

- The mean (average) of the X and Y inputs.
- Correlation coefficients.
- Analysis of variance.
- Regression equation coefficients.
- Table of residuals.
- Plot (graph) of the input and output values.

Program L261 can also be used to compute actual wood growth for the past decade by changing a request input. Please refer to Data Card #1 of Parameter Card #2. Actual tree growth is computed from increment borings of the tree trunk, total tree height, tree diameter, form class, bark thickness, and site quality. Individual tree growth is also weighted by tree density, acreage expansion factors and timber stand age classes.

c. Job Control Language for L261-262

```
*REMC
*OLD A185/JCL/L261-262,R
*LIST

##N,J
$:IDENT:185, MOREDOCK
$:OPTION:CBL74
$:SELECT:A134/OBJ/L261OBJ
$:EXECUTE:DUMP
$:LIMITS:20,22K,,20K
$:DATA:I*R
#DATACRDiDATACRD2DATACRD3
#2NDDATA12NDDATA22NDDATA3
#3RDDATA13RDDATA23RDDATA33RDDATA4
$:TAPE9:T2,X1D,,MSTRTAPE,,AMFL240,,DEN16
$:FILE:S1,,75R
$:FILE:S2,,75R
$:FILE:D1,,F1S
$:FILE:D2,,F2S
$:SYSOUT:P1,ORG
$:OPTION:FORTRAN
$:SELECT:A134/OBJ/L262OBJ
$:EXECUTE:DUMP
$:LIMITS:20,55K,,12K
$:FILE:01,X5S
$:FILE:07,F1R
$:FILE:05,F2R
$:SYSOUT:06,ORG
$:ENDJOB
```

d. CRUN Listing for L261-2

```
*LIST A134/CRUN 2612

##;(MSTRTAPE?)
OLD A185/JCL/L261-262,R
SYST
EDIT
RS:/DATACRD1/
$*$USER=ENTER DATA CARD1 FROM P1?
$*$NULL
RS:/DATACRD2/
$*$USER=ENTER DATA CARD2 FROM P1?
$*$NULL
RS:/DATACRD3/
$*$USER=ENTER DATA CARD3 FROM P1?
$*$NULL
```

```
RS:/2NDDATA1/
$*$USER=ENTER DATA CARD1 FROM P2?
$*$NULL
RS:/2NDDATA2/
$*$USER=ENTER DATA CARD2 FROM P2?
$*$NULL
RS:/2NDDATA3/
$*$USER=ENTER DATA CARD3 FROM P2?
$*$NULL
RS:/3RDDATA1/
$*$USER=ENTER DATA CARD1 FROM P3?
$*$NULL
RS:/3RDDATA2/
$*$USER=ENTER DATA CARD2 FROM P3?
$*$NULL
RS:/3RDDATA3/
$*$USER=ENTER DATA CARD3 FROM P3?
$*$NULL
RS:/3RDDATA4/
$*$USER=ENTER DATA CARD4 FROM P3?
$*$NULL
RS:/MSTRTAPE/;*:/#1/
B
RS:/,J/
$*$USER=DISPOSITION(CARRIAGE RETURN FOR ONLINE ELSE ENTER ,J)?
$*$NULL
DONE
LIST


REMC
COUT
RUN
COUT


*BYE
```

2. Summary

The CRUN2612 calls the combined JCL for L261 (/JCL/L261-262) and produces the Tree Summary Report and the Poly/Regression.

a. L261:

1) Input = L240 Master File
2) Input = Parameter Card through CRUN
3) Output = L261 report (SIMIX-Tree Summary)
4) Output = Temporary files (D1 and D2)

b. L262:

1) Input = Temporary files (D1 and D2) from L261
2) Output = L262 report (SIMIX-Poly/Regression)

Both first- and second-degree equations are produced by L262.

3. Form

A134/CRUN2612

4. User Response to CRUN Queries

a. MSTRTAPE? _ _ _ _ _

Punch in the number of the L240XX Versional Master Tape.

Parameter Card #1

Parameter Card #1 contains spaces for 36 characters. This data is entered on three data cards. Prepare an identification message for the report to be printed by the computer. The identity message cannot be more than 36 characters long. For example: Parameter Card #1 = (Missoula 01, MFP#2, CC + PC-0, PC-1, PC-2, #11148) = 48 characters: Twelve characters must be dropped.

b. ENTER DATA CARD1 FROM P1? _ _ _ _ _ _ _ _ _ _ _ _

Key in the first set of 12 characters.

c. ENTER DATA CARD2 FROM P1? _ _ _ _ _ _ _ _ _ _ _ _

Key in the second set of 12 characters from the Identification Parameter Card.

d. ENTER DATA CARD3 FROM P1? _ _ _ _ _ _ _ _ _ _ _ _

Key in the third set of 12 characters from the Identification Parameter Card.

Parameter Card #2

Information from Parameter Card #2 will be entered on the following three data cards. Twelve character spaces are available on each of these three cards.

e. ENTER DATA CARD1 FROM P2? _ _ _ _ _ _ _ _ _ _ _ _

1) Enter an "x" in Columns 1 through 5 to indicate the volume formula being used:

Column	Volume Code
1	Scribner Fixed Top; 6.0" + DBH
2	Scribner Variable Top; 9.0" + DBH
3	International 1/8" Fixed Top; 6.0" + DBH
4	International 1/8" Variable Top; 9.0" + DBH
5	Cubic 5.0" + DBH; 4.0" + DBH

2) Enter an X in either Column 6 or Column 7:

Column	Output Tables
6	Tree volumes
7	Past 5 years of tree growth

3) Enter the word "ASGAGE" in Columns 8 through 13 if the data is to be plotted according to the "management age" assigned to the plot data. Note that you cannot key in the last letter "E" (Column 13) on Card 1. Hit Carriage Return (CR) when the first 12 characters have been key typed.

f. ENTER DATA CARD2 FROM P2? _ _ _ _ _ _ _ _ _ _ _ _

(Parameter Card #2, Columns 13-24 incl.)

Key in the letter "E" in Column 13. Key in the beginning position and the ending position of PLOT AGE (as identified on the L240 Master File) in Columns 14 through 19 of Parameter Card #2. If assigned plot age is to be used, it is found in position 482, 483, and 484 of the Master File. The number 482, therefore, is keyed in positions 2, 3, and 4 of DATA CARD2, Parameter Card #2. Enter the number 484 in spaces 5, 6, and 7 of DATA CARD2.

g. ENTER DATA CARD3 FROM P2? _ _ _ _ _ _ _ _ _ _ _ _

(Parameter Card #2, Columns 25-36)

Key in a "1" in Column 36 of Parameter Card #2; this is Column 12 of DATA CARD3.

Parameter Card #3

Data for Parameter Card #3 is entered on four data cards. Sections h. through k. explain the method for selecting a single harvest code from the Master File Record. Follow the explanations in Sections l. through n. for selecting combinations of several harvest codes.

h. To develop a regression of only one harvest class:

ENTER DATA CARD1 FROM P3? _ _ _ _ _ _ _ _ _ _ _ _

(Parameter Card #3. Columns 1-12 incl.)

1) Write in the allowable cut alternative to be used in this report, i.e., URA, MFP-1 or MFP-2, in Columns 1 through 6 inclusive.

2) Find the Master File position numbers from the Data File Layout Sheet for the URA or MFP run selected. Enter the beginning position number in Columns 7 through 9. Enter the ending position number in Columns 10 through 12. Refer to positions 560 through 566 on the Master File Layout Record.

ENTER DATA CARD2 FROM P3? _ _ _ _ _ _ _ _ _ _ _ _

(Parameter Card #3: Columns 13-24 incl.)

i. 1) The selecting criteria for harvest codes is to be entered in Column 13, which is Space 1 of this data card. Use the symbol "=" (equals) in selecting one of the following harvest systems to be compiled.

Harvest Codes

Code 1 = CC	= Clearcut Management Regime
Code 2 = PC-0	= Partial Cutting Regime; Initial Cut (Well-Stocked Stands)
Code 3 = PC-1	= Partial Cutting Regime; Intermediate Cut (Medium-Stocked Stands)
Code 4 = PC-2	= Partial Cutting Regime; Final Cut (Poorly Stocked Stands)
Code 5	= Excluded Acreage (Not in this Unit)
Code 6	= Multiple use restricted (100 percent restricted)

2) If only one harvest class is to be selected, i.e., clearcut, PC-0, PC-1, or PC-2, place the harvest code in Column 2 of this DATA CARD2, which is Column 14 of Parameter Card #3.

j. ENTER DATA CARD3 FROM P3? _ _ _ _ _ _ _ _ _ _ _ _ _

There is no entry for CARD3.
Enter a null response.

k. ENTER DATA CARD4 FROM P3? _ _ _ _ _ _ _ _ _ _ _ _ _

1) Key in a "2" in position 48 of Parameter Card #3; this is Column 12 of DATA CARD4. Punch the Carriage Return key. The word "Disposition" will appear.

2) Refer to Section p. for disposition of the report just created.

To combine two or more harvest codes in the acreage and volume summaries and in the regression equation, follow Steps 1. through n. inclusive.

l. ENTER DATA CARDl FROM P3? _ _ _ _ _ _ _ _ _ _ _ _ _

Two or more harvest systems, such as PC-0, PC-1, and PC-2 (Codes 2 through 4), may be combined under one management regime by using the following sample procedure; use boundaries of >1 (greater than one) and <5 (less than five).

1) Select the management regime, i.e., URA, MFP #1 or MFP #2 desired, and key the alternative in Columns 1 through 6 of DATA CARDl.

2) Enter the beginning position location numbers of the harvest code in Columns 7 through 9 of DATA CARDl. Refer to the Master File Layout for the position number.

3) Enter the ending position location number of the harvest code in Columns 10 through 12 of DATA CARDl. Punch the Carriage Return (CR) key.

m. ENTER DATA CARD2 FROM P3? _ _ _ _ _ _ _ _ _ _ _ _ _

1) Enter the code ">" (greater than) in Column 1 of DATA CARD2. This is Column 13 of Parameter Card #3.

2) Enter the code "1" in Column 14 of DATA CARD2. Punch the Carriage Return key.

n. ENTER DATA CARD3 P3? _ _ _ _ _ _ _ _ _ _ _ _ _
(Parameter Card column 25 through 36 incl.)

1) Enter the beginning position location number of the harvest code, as shown on the Master File Layout Report, in Columns 4 through 6 of DATA CARD3. These are Columns 28 through 30 of Parameter Card #3.

2) Enter the ending position location numbers of the harvest code in Columns 7 through 9 of DATA CARD3. These are Columns 31 through 33 of Parameter Card #3.

3) Enter the code "<" (less than) in Column 10 of DATA CARD3.

4) Enter the code "5" in Column 11 of DATA CARD3. Punch the Carriage Return key to enter the input data.

o. ENTER DATA CARD4 FROM P3? _ _ _ _ _ _ _ _ _ _ _ _ _

1) Key in a "2" in Column 12 of DATA CARD4. This is Column 48 of Parameter Card #3.

2) Punch the Carriage Return key. The word "Disposition" will appear.

p. DISPOSITION?

1) Punch the Carriage Return key for direct on-line printing of the report at the main printer.

2) The job should go to normal termination and the report will be printed by the mainline printer without any further action by the Terminal User.

3) Key in ",J" to monitor the progress of the job execution:

```
*JMON "SNUMB"
Normal Termination
*JOUT "SNUMB"
Function:  LIST
           DIRECT ONL
           EPRINT 06
```

q. MASTER FILE LAYOUT POSITIONS

NAME	POSITION LOCATION
Assigned Age xxx	482 - 484 incl.
URA Harvest Code	560 - 560
MFP #1 Harvest Codes	561 - 561
MFP #1 Multiple-Use Code	562 - 562
MFP #1 M.U. Restriction %	563 - 563
MFP #2 Harvest Code	564 - 564
MFP #2 Multiple-Use Code	565 - 565
MFP #2 M.U. Restriction %	566 - 566
Scribner Fixed T. Volume	567 - 572
Scribner Variable Top Volume	573 - 578
International 1/8 Fixed Top	579 - 584
International 1/8 Variable Top Volume	585 - 590
Cubic Volume: Four-Inch Top	591 - 596
Growth	597 - 626

r. Individual Tree Growth

Growth of individual trees is recorded on the Master File as gross growth for the past five-year period. Midpoint diameter and reduced tree height are used to reconstruct tree size as of the middle of the ten-year incremental period used in the inventory. Tree cull factor percentages are used to reduce gross growth to net growth.

s. Sample Report.

Please see page 110 for a sample page of an L261 report.

ASGAGE=200 NUMBER OF PLOTS= 2 ASGAGE TOTAL EXP.FACTOR= 858.360

PLOT NUMBER	EXPANSION FACTOR	ADJUST FACTOR	TREE VOLUME	TREES PER ACRE	VOLUME PER ACRE	ADJUSTED VOLUME	WEIGHTED VOL/ACRE	TRE	SPC	DBH	HGT	FORM CLASS	NMBR LOGS	
110	428.632	0.4994	890.38	10.136	902.49			659	122	26.9	096	.791	5.0	
110	428.632	0.4994	359.05	13.864	497.79			665	202	23.0	081	.746	3.0	
110	428.632	0.4994	578.04	14.619	845.04			666	122	22.4	099	.770	4.5	
110	428.632	0.4994	399.59	17.628	704.40			667	202	20.4	093	.761	3.5	
110	428.632	0.4994	376.00	23.682	890.44			668	122	17.6	113	.734	5.5	
110	428.632	0.4994	21.80	97.087	211.65			669	202	8.7	047	.665	1.5	
110	428.632	0.4994	260.21	21.436	557.79			663	122	18.5	072	.741	3.5	
110	428.632	0.4994	532.05	13.395	712.68			664	122	23.4	085	.775	4.0	
110	428.632	0.4994	1387.40	7.299	1012.66			662	122	31.7	096	.800	4.0	
110	428.632	0.4994	297.80	20.757	618.14			660	202	18.8	075	.737	3.5	
110	428.632	0.4994	332.00	20.325	674.79			661	202	19.0	080	.745	4.0	
110	428.632	0.4994	685.93	10.767	738.54			670	122	26.1	090	.788	4.5	
110	428.632	0.4994	461.38	12.221	563.85			671	122	24.5	085	.781	4.0	
110	428.632	0.4994	142.59	32.180	458.85			672	122	15.1	066	.709	3.0	
110	428.632	0.4994	770.20	14.619	1125.96			673	202	22.4	118	.782	6.0	
110	428.632	0.4994			10515.07	5251.225	10502.45							PLOT TOTAL *** ***
203	429.728	0.5006	2911.00	5.188	1510.23			129	122	37.6	142	.800	7.0	
203	429.728	0.5006	2401.25	5.445	1307.48			130	122	36.7	145	.800	6.5	
203	429.728	0.5006	1559.65	6.307	983.67			131	122	34.1	133	.800	6.0	
203	429.728	0.5006	1559.65	6.307	983.67			131	122	34.1	133	.800	6.0	
203	429.728	0.5006	24.80	86.767	215.18			132	122	9.2	053	.636	2.0	
203	429.728	0.5006	1043.20	6.382	665.77			133	122	33.9	095	.800	4.5	
203	429.728	0.5006	1460.01	7.439	1086.10			134	122	31.4	110	.800	5.0	
203	429.728	0.5006	1574.90	8.203	1291.89			135	122	29.9	125	.797	6.0	
203	429.728	0.5006	250.80	27.952	701.04			136	202	16.2	085	.752	3.5	
203	429.728	0.5006	393.82	18.527	729.63			137	202	19.9	085	.752	3.0	
203	429.728	0.5006	603.30	13.508	814.94			138	202	23.3	090	.758	2.5	
203	429.728	0.5006	732.30	13.745	1006.55			139	202	23.1	107	.774	4.0	
203	429.728	0.5006	1974.30	6.419	1267.30			140	122	33.8	120	.800	5.5	
203	429.728	0.5006	89.10	61.728	550.00			141	202	10.9	080	.745	2.5	
203	429.728	0.5006	37.20	94.786	352.60			142	202	8.8	065	.719	1.5	
203	429.728	0.5006	95.40	50.955	486.11			143	202	12.0	070	.729	2.5	
203	429.728	0.5006	9.10	149.812	136.33			144	202	7.0	045	.657	.5	
203	429.728	0.5006	1743.55	6.735	1174.28			125	122	33.0	116	.800	5.5	
203	429.728	0.5006	1660.90	7.392	1227.74			126	122	31.5	117	.800	5.5	
203	429.728	0.5006	600.20	15.723	943.69			127	122	21.6	104	.765	4.5	
203	429.728	0.5006	516.04	14.109	728.08			128	202	22.8	086	.753	3.5	
203	429.728	0.5006			18162.28	9092.038	18184.07							PLOT TOTAL *** ***
	858.360	0.9990			14343.56	14343.263	14343.26							DEPENDENT VARIABL TOTL ***

C. Curve Harmonizer Program: L263

1. Execution of CRUN L263

The curve harmonizer program is designed to take the three volume equations developed separately for poorly-stocked, medium-stocked, and well-stocked field plots and harmonize them in relation to a preset standard curve, generally the combined equation developed from all plots classified for harvest under the shelterwood harvest system. Each curve and portion of the curve is weighted proportionately in relation to their acreage and the existing volume.

The program can also be used to develop intermediate average yield curves from an irregular population of (for example), high, low, and medium site quality acreages of different species.

2. Compiling Program Input Data

Program L263 requires a specialized input format as shown by Figures 1 through 3, p. 113 - 115. The PC-All and at least one of the other equations, PC-0, PC-1, or PC-2, must be completed. Each age-class line must be completed, showing the number of plots and actual weighted volumes for those plots, or else the line must be zero-filled.

The program report develops a revised, adjusted equation and a percentage figure for each of the comparison curves. For example, Revised Curve No. 1 (PC-0) may be shown as being 203 percent of the Master Curve (PC-ALL) and its value would be printed as: $A + B(X) - CX^2$, see Table 1 (sample printout), p. 116.

3. Data Input

Keypunch and store the input data on a Key Entry BCD Tape.

4. CRUN Listing for L263

```
*LIST CRUN263
##,( DATAFILE?)
OLD A185/JCL/L263JCL,R
SYST
EDIT
RS:/"KEYNO"/:*:/#1/
B
RS:/,J/
$*$USER=DISPOSITION(CARRIAGE RETURN FOR ONLINE,
                    ELSE ENTER ,J )?
$*$NULL
```

```
DONE
LIST
REMC
COUT
RUN
COUT


*LIST
##N,J
$:IDENT:A185,HORAK
$:OPTION:FORTRAN
$:SELECT:A134/OBJ/L263OBJ
$:EXECUTE
$:LIMITS:20,35K,,20K
$:PRMFL:05,R,S,A134/DATA/KEYNO
$:SYSOUT:06,ORG
$:ENDJOB
```

5. Summary

The CRUN for L263 SIMIX, Curve Harmonizer, accomplishes the following activities:

a. Reads a key-tape as the only input.
b. Produces a SIMIX Curve Harmonizer Report.

6. Form

A134/CRUNL263

7. Responses to CRUN Queries

a. DATAFILE? _ _ _ _

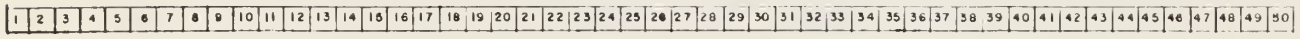
Enter the key-tape number (example: K135)

b. DISPOSITION? _ _

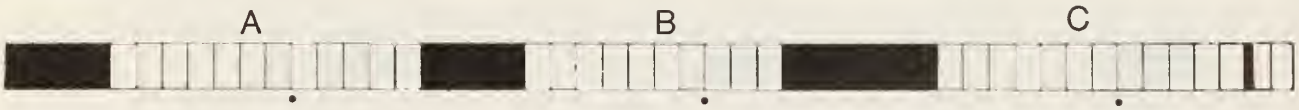
Punch Carriage Return key for report to be printed on the mainline printer. Key in " ,J" to monitor the job execution.

```
*JMON "SNUMB"
Normal Termination
*JOUT "SNUMB"
Function?  LIST
           DIRECT ONLINE = Mainline printer
           EPRINT XX = Remote terminal printer
```

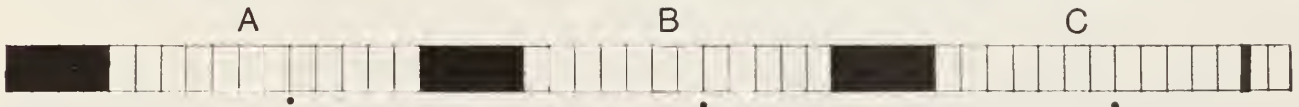
Figure 1. CURVE HARMONIZER PROGRAM: L263 Input Format.



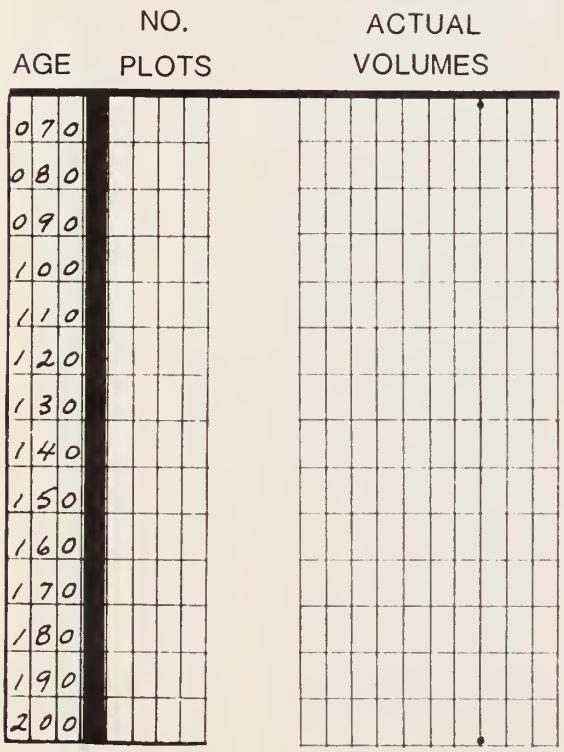
Master Equation: PC-ALL

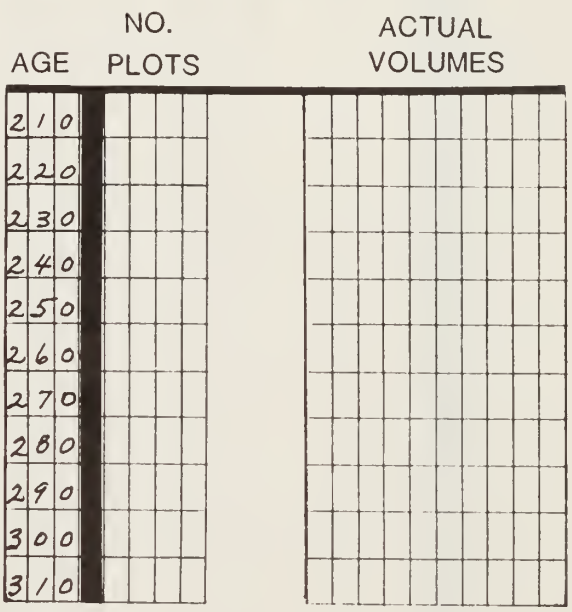


Equation #1: PC-O



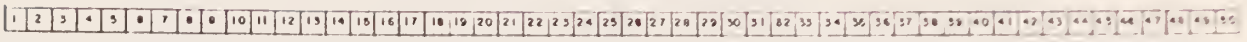
Field Plot Data: PC-O* (continued)





*Zero--fill each line that does not contain sample field data.

Figure 2. CURVE HARMONIZER INPUT FORMAT.

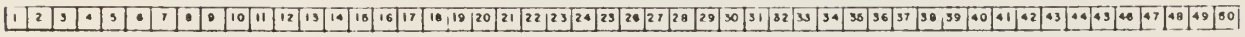


Equation #2: PC-1

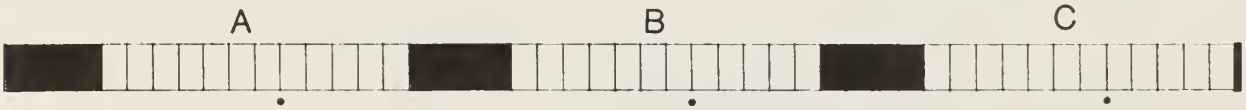
Field Plot Data: PC-1

AGE	NO. PLOTS	ACTUAL VOLUMES
070		
080		
090		
100		
110		
120		
130		
140		
150		
160		
170		
180		
190		
200		
210		
220		
230		
240		
250		
260		
270		
280		
290		
300		
310		

Figure 3. CURVE HARMONIZER INPUT FORMAT.



Equation #3: PC-2



Field Plot Data: PC-2

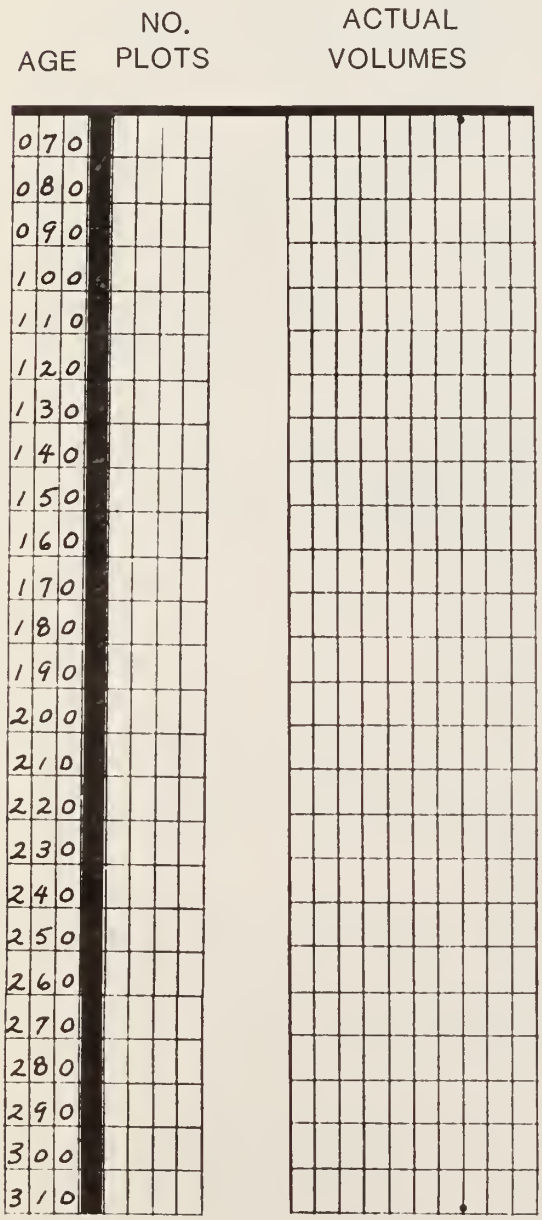


TABLE 1 - INITIAL PARTIAL CUT

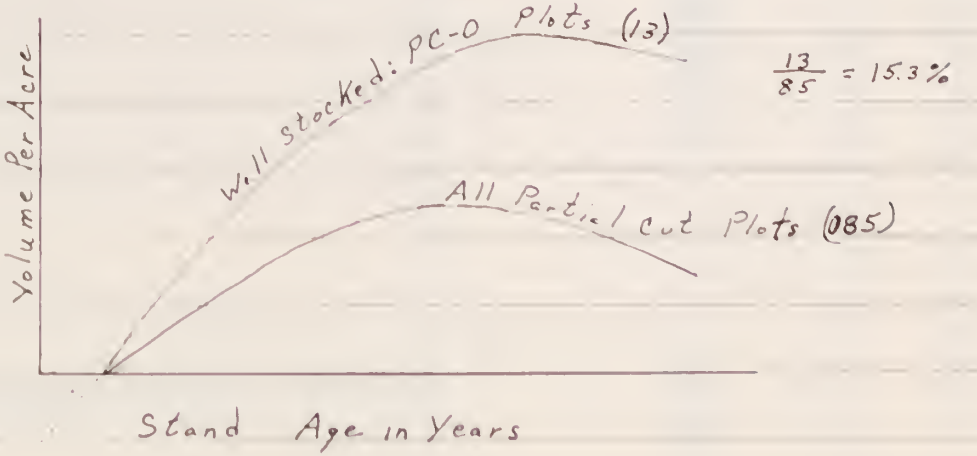
THE REVISED INITIAL PARTIAL CUT IS 2.03 TIMES THE "ALL" PARTIAL CUT

AGE	PC ALL	NO. PLOTS	PRED. PCO	ACTUAL PCO	RATIO	REV. PCO	RESIDUAL
70.	7076.110	1	13866.765	9887.230	1.397267	14331.794	-4444.564
80.	7951.647	1	15670.823	16334.990	2.054	16105.474	229.516
90.	8762.595	1	17386.510	17432.750	1.985	17788.049	-355.299
100.	9568.360	2	19013.848	19898.420	2.080	19379.518	1037.804
110.	10309.145	2	20552.835	23426.960	2.273	20679.682	5098.156
120.	11064.944	0	22003.472	0.000	0.000	22289.140	0.000
130.	11655.763	1	23365.760	20148.350	1.729	23607.293	-3458.943
140.	12261.600	0	24639.697	0.000	0.000	24834.340	0.000
150.	12862.455	0	25825.285	0.000	0.000	25970.282	0.000
160.	13338.320	1	26922.522	21203.540	1.590	27015.119	-5811.579
170.	13809.219	0	27931.409	0.000	0.000	27968.850	0.000
180.	14235.120	1	28851.947	28740.070	2.019	28831.476	-90.506
190.	14616.050	0	29684.134	0.000	0.000	29602.996	0.000
200.	14952.001	2	30427.972	38781.170	2.594	30283.411	16995.518
210.	15242.964	0	31083.459	0.000	0.000	30872.721	0.000
220.	15486.945	0	31650.596	0.000	0.000	31370.925	0.000
230.	15689.944	1	32129.384	22032.360	1.404	31778.023	-9745.663
240.	15845.961	0	32519.821	0.000	0.000	32094.016	0.000
250.	15956.996	0	32821.909	0.000	0.000	32318.904	0.000
260.	16023.049	0	33035.646	0.000	0.000	32452.686	0.000
270.	16044.120	0	33161.033	0.000	0.000	32495.363	0.000
280.	16020.209	0	33198.071	0.000	0.000	32446.935	0.000
290.	15951.317	0	33146.758	0.000	0.000	32307.401	0.000
300.	15837.446	0	33007.096	0.000	0.000	32076.761	0.000
310.	15678.585	0	32779.083	0.000	0.000	31755.017	0.000
		13					-545.562

THE RESIDUAL TOTAL IS -545.562

THE PC ALL EQUATION IS
A= -313.46137
B= 121.30941
C= -0.22471

THE REVISED PCO EQUATION IS
A= -634.91739
B= 245.69707
C= -0.45553



$\frac{13}{85} = 15.3\%$

D. Multiple-Use Restrictions: L248

1. Execution of CRUNL248

Program L248 uses multiple-use restriction codes and percentage reduction in timber yield anticipated upon application of multiple-use concepts to the forest simulation modeling programs.

2. CRUN for L248

```
*LIST CRUNL248
##NULL;(KEYTAPE?,240TAPE?,220TAPE?)
SYST
OLD A185/JCL/L248JCL,R
EDIT
RS:/"KEYTAPE"/:/#1/
RS:/"240TAPE"/:/#2/
RS:/"220TAPE"/:/#3/
B
RS:/"$"/
$*$USER= IF 220 TAPE PRESENT ENTER $ ELSE ENTER /?
$*$NULL
B
RS:/ ,J/
$*$USER= DISPOSITION (FOR JOUT ENTER ,J
                  ELSE HIT CARRIAGE RETURN)?
*NULL
DONE
COUT
RUN
COUT
```

3. Job Control Language

```
*OLD A185/JCL/L248JCL,R
*LIST

##A,J N
$:IDENT:A185,MOREDOCK
$:CONVER
$:TAPE7:IN,X4D,,KEYTAPE,,,,DEN5
$:INPUT:LODENS,NLABEL,MBCD,NSER,FIXLNG/14
$:FILE:OT,X4S
$:OPTION:CBL74
$:SELECT:A134/OBJ/L248OBJ
$:EXECUTE:DUMP
$:LIMITS:30,32K,,45K
$:FILE:R1,X4R
```

```
$:TAPE9:T2,X2D,,"240TAPE",,AMFL240,,,DEN16
"$":TAPE9:T1,X1D,,"220TAPE",,AMFL220,,DEN16
$:FILE:D1,S1R,100R
$:FILE:D2,S2R,100R
$:FILE:D3,S3R,100R
$:SYSOUT:L1,ORG
$:ENDJOB

*
```

4. Summary

The CRUN for L248, Multiple-Use Factors, accomplishes the following activities:

a. Reads in the L240XX Master File Tape.

b. Reads in a key-tape which specifies the type of output desired.

c. Produces a Multiple-Use Factor Report which shows the amount of reduction to apply to the allowable cut because of multiple-use restrictions applied to Timber Harvesting on productive forest acreage.

5. Form

A134/CRUNL248

6. Responses to CRUN Queries

a. KEYTAPE? _ _ _ _

Punch in the number of the key-tape which identifies the MFP alternative.

b. L240TAPE? _ _ _ _

Enter the L240 Master File Tape number.

c. L220TAPE? _ _ _ _

Enter the L220 Master File Tape number (L220 is the Field Location Edit Update program) if assigned age, harvest codes, and/or multiple-use restriction codes are updated. Otherwise enter "99999."

d. IF L220 TAPE IS PRESENT ENTER $, ELSE ENTER *? _ _

Enter a $ or * as requested.

e. DISPOSITION? _ _

Punch the Carriage Return key for the report to be printed on the mainline printer.

Punch ,J to monitor the job execution.

```
*JMON "SNUMB"
Normal Termination
*JOUT "SNUMB"
Function?  List
           DIRECT ONLINE
           or
           EPRINT 06
```

7. Other

The L240 Master File contains space for two MFP multiple-use restriction codes. Refer to the following page for use of the harvest system codes, the multiple-use codes, and the percentage reduction codes.

Table 1. Multiple-Use Restriction Codes.

ADP Code	Restriction Title	No. of Plots	Restricted Acreage	% Reduction Upon Timber Harvest
1X	Wildlife Habitat			
2X	Streamside			
3X	Watershed			
4X	Scenic			
5X	Recreation			
6X	Topographic			
7X	Right/Way			
8X	Research (Natural)			
9X	Other			

X = Code for percentage of total yield (volume) reduction.

When X = 0, yield reduction is 100%. When X = 1, yield reduction is 10%.

X. Forest Simulation Modeling: Programs L264 and L265

A sophisticated, computerized forest simulation model is used to predict growth, yield, and the potential harvest levels attainable from a forest property for a period of up to 40 decades. The model used by the BLM is named "SIMIX," which is an acronym for Simulating Intensive Management for Mixed Stands. It is an updated, revised version of Simulating Intensively Managed Allowable Cut (SIMAC), which could only handle a clearcut management regime. The conceptual basis and early COBOL version of SIMAC were developed by Karl Bergsvik and Don DeBerard of the BLM.

SIMIX calculates a potential harvest cutting level associated with a stated forest management plan for even-aged timber stands. It can maximize an even flow of cut for a specified management regime, or a series of individual variable cuts for as many as the first 10 decades, followed by even-flow cuts. Calculations are made for each decade for a maximum of 40 decades. Acreage and volume in each age class that will be treated in the decade are computed using criteria and data specified in the input.

SIMIX computes a harvest rate based on present timber inventory data and the projected growth of both present stands and future regenerated stands resulting from some or all of the following management practices: nontreatment precommercial thinning only, precommercial and commercial thinning, commercial thinning only, mortality-salvage, forest genetics and final harvest volume. Other treatments, such as fertilization, can be included along with one or more of the treatments mentioned above. The results of these treatments are reflected in the slope of future yield curves.

SIMIX must be told what treatments to apply, when, and on how many acres. No rotation age is set, although a minimum harvest age is specified. Two forest management regimes, a clearcut harvest system, and a two- or three-stage shelterwood removal system can be combined into one sustained-yield unit forest property. Up to 75 individual growth and yield equations must be developed separately and fed into the program to reflect the simulated results of a single management proposal (computer run). A summary of major options allowed in the program is as follows:

Figure 1. SIMIX OPTIONS

VOLUME INDICATOR	= 1	THINNING AND MORTALITY INCLUDED
	2	THINNING AND MORTALITY EXCLUDED
	3	THINNING EXCLUDED, MORTALITY INCLUDED
	4	THINNING INCLUDED, MORTALITY EXCLUDED
MANAGEMENT OPTION	= 1	CLEAR CUT ONLY
	2	PARTIAL CUT ONLY, 3-STAGE, 10-YEAR CYCLE
	3	PARTIAL CUT ONLY, 2-STAGE, 10-YEAR CYCLE
	4	PARTIAL CUT ONLY, 2-STAGE, 20-YEAR CYCLE
	5	CLEAR CUT AND PARTIAL CUT (2 ABOVE)
	6	CLEAR CUT AND PARTIAL CUT (3 ABOVE)
	7	CLEAR CUT AND PARTIAL CUT (4 ABOVE)
SYSTEM OF MANAGEMENT	= F	FIXED, EVEN FLOW THROUGH PROJECTION PERIOD
	M	MODULATED, ACCELERATED HARVEST OF OLD GROWTH
REGENERATION LAG	=	FROM -10 to +15 YEARS
MINIMUM HARVEST AGE	=	ANY AGE
MAXIMUM THINNING AGE	=	NINETY (90) YEARS
INITIAL HARVEST	=	SPECIFY: WELL-STOCKED OR POORLY STOCKED STANDS

NOTE - VOLUME AND GROWTH REGRESSIONS FOR PARTIAL CUT MANAGEMENT OPTIONS

2+5	PC1 = KONE * PCO, PC2 = KTWO * PCO
3+6	PC1 = PC3 , PC2 = KONE * PCO
4+7	PC1 = KONE * PCO, PC2 = PC1

The forest simulation modeling programs have certain built-in controls for their use. Please refer to Section G, p. 129 for obtaining permission to use these programs.

A. Preparation Phase

Two separate systems are available for computing a potential harvest level with the SIMIX modeling system. The quick access file system using A134/RUNL264 is set up for time-sharing remote terminal use. The other system, CRUNL264 (an Object Program Routine), is set up for DSC programmer use. The DSC system allows experimentation with program modifications without disrupting normal program operation.

1. Input Information

Up to 23 pages of input forms are filled out and submitted to data entry for keypunching. The key-tape produced by data entry is then transferred onto a user's data file storage space. Remote terminal users may enter the input data directly onto their file space if desired.

The SIMIX input file can be examined under the edit subsystem and corrections, updates, or changes made as desired.

It is also advisable to store the original modeling inputs in one file space and to use a second file space for edits and updates. This keeps the original input safe from losses due to transmission failures, errors in manipulating the file, and incorrect input.

2. Program Operation

Keypunched data is fed into program L264. This program edits and reformats the input data and produces a report (printout). Program L264 also analyzes the growth and yield equations. A table is printed showing the x and y intercepts and the peaks of each curve. A temporary file is created that is then fed into Program L265, the allowable cut modeling program which produces the allowable cut report from the forest model inputs.

B. Loading and Editing Phase

1. Loading File Space

a. /LOADL264

This program is used to load a key-tape containing SIMIX Input Data onto PRMFL L264 (permanent disc file space). The user must have the key-tape number.

The user may use the LOADDATA Command under the Time Sharing System and store SIMIX input data under any catalog or file string.

b. CRUN Listing for L264-L265

```
*List/LOADL264
##; (KEYTAPENO?)
OLD A185/LOADL264,R
SYST
EDIT
RS:/"KEYNO"/;*:/#1/
B
RS:/,J/
$*$USER=DISPOSITION(CARRIAGE RETURN FOR ONLINE,
                    ELSE ENTER ,J)?
$*$NULL
DONE
REMC
COUT
RUN
COUT
```

The original SIMIX input data will reside in file space Data/L264 until it is overwritten or released. Use file space /Data/EditL264 for storage of edited or updated SIMIX input parameters.

2. Editing & Updating SIMIX Input File

To review the data stored in file space L264 and to make edit changes, use the Convert System as follows:

```
*CONVER /DATA/L264
```

The Convert Subsystem converts BCD to ASCII Language. An asterisk will appear upon completion of conversion. Enter the following commands in response to the asterisk:

```
*EDIT VERI STRI CASE
```

You have just given the machine instructions to:

"Call in the Edit Subsystem, verify all changes, use the string instead of line mode, and do not differentiate between upper- and lower-case letters."

Make edit updates as desired.

All edit changes are now complete. Save the edited data and place it in a file named EDITL264 by keying in the following command:

```
-RESAVE /DATA/EDITL264
```

To reconvert from ASCII to BCD Language:

```
*CONVER /DATA/L264=/DATA/EDITL264:BCD,C(1-80),V

or

*CONVER *=/DATA/EDITL264:BCD,C(1-80)
```

At this point, the SIMIX input data has been reviewed, all apparent errors have been removed, and the correct information is stored in /EDITL264 file space in BCD language. User is now ready to run the simulation modeling program.

C. Execution of SIMIX

Use the quick access version. When the asterisk appears, key in:

```
*A134/RUNL264
```

The terminal will then print a list of queries.

1. Response to A134/RUNL264 Queries

KEYTAPENO? _ _ _

Provide the name of the input file (EDITL264).

DISPOSITION?

Hit the Carriage Return key for printing the outputs on the mainline printer. Punch ",J" to monitor the job execution. To monitor the job before requesting it to be printed, enter ",J" only, and then the following:

```
*JMON (SNUMB)
Normal Termination or Abnormal Termination will print.
*JOUT (SNUMB) upon normal termination.
Function?  DIRE ONL for directing the printout to the mainline
                    printer,
           or
           EPRINT 06 for printing at the remote terminal.
```

2. Abnormal Termination:

If an abnormal termination occurs, review your input data for conflicts column by column and line by line and resubmit the run. If the abort message is repeated, contact your Programmer Specialist for Dump and Debug assistance.

3. CRUN Listing for L264-L265

```
*List A134/RUNL264
##;(FILE NAME?)
OLD A185/JCL/RUNL264,R
SYST
EDIT
RS:/DATANAME/;*:/#1/
B
RS:/,J/
$*$USER=DISPOSITION(CARRIAGE RETURN FOR ONLINE ELSE ENTER ,J)?
$*$NULL
DONE
REMC
COUT
RUN
COUT
```

4. Job Control Language

```
*LIST A185/JCL/L264JCL
0010##N,J
0020$:IDENT:A185,MOREDOCK
0030$:CONVER:NSPIN,DUMP
0040$:LIMITS:20,10K
0050$:TAPE7:IN,MIDD,,"KEYNO",,KEYTAPE,,DEN5
0060$:INPUT:LODENS,NLABEL,MBCD,NSER,FIXLNG/14
0070$:FILE:OT,M2S
0100$:OPTION:FORTRAN
0110$:SELECT:A134/OBJ/L264OBJ
0120$:EXECUTE:DUMP
0130$:LIMITS:20,30K,,10K
0140$:FILE:05,M2R
0150$:FILE:07,M3S
0160$:OPTION:FORTRAN
0162$:SELECT:A134/OBJ/L265OBJ
0164$:EXECUTE:DUMP
0170$:LIMITS:20,50K,,50K
0180$:FILE:07,M3R
0200$:ENDJOB
*REMC
```

5. Summary

The A134/RUNL264 program calls the combined JCL for L264 and L265 and produces the following two reports:

a. L264:

(1) Input = Key-tape or data file.
(2) Output = L264 Report (approximately 32 pages) and temporary FILE07.

b. L265:

(1) Input = Temporary FILE07 from L264.
(2) Output = L265 Report (Allowable Cut Model), up to 500 pages.

D. The CRUN SIMIX System

The second of the two methods computes a potential forest harvest level, or allowable cut, by using the SIMIX Forest Modeling System in the CRUN system.

The CRUNL264 computer command uses the Object Program System and is a backup for the A134/RUNL264 Time Sharing System.

1. CRUN CRUNL264

The job control language for this CRUN will only accept a key data tape. This key-tape is prepared by the Keyentry Operation at DSC, and the data is converted directly into the BCD machine language. The remote terminal user cannot make any direct corrections or changes to this key-tape. The user can review the key entry data by loading it into a temporary file space and requesting a listing of the data. Corrections or updates must be submitted to the Data Control Staff at DSC, and a corrected key-tape received before continuing.

2. Summary

The CRUNL264 calls the combined listing for L264 and L265 (/JCL/L264JCL) and produces 2 reports.

a. L264:
(1) Input = Key-tape # (771)
(2) Output = L264 Report (Allowable Cut Input Formatter) and temporary FILE07

b. L265:
(1) Input = Temporary FILE07 from L264
(2) Output = L265 Report (Allowable Cut Model)
L265 Report (Allowable Cut Input Formatter)

3. CRUN Listing for CRUNL264

```
*#LIST CRUNL264
(CRUN CRUNL264)
##;( KEYTAPENO? )
OLD A185/JCL/L264XX,R
SYST
EDIT
RS:/"KEYNO"/;*:/#1/
B
RS:/,J/
$*$USER=DISPOSITION(CARRIAGE RETURN FOR ONLINE ELSE ENTER ,J)?
$*$NULL
DONE
LIST
REMC
COUT
RUN
COUT
```

4. Form

A134/CRUNL264

5. Responses to CRUN Queries

KEYTAPENO? Provide key-tape number, for example (K507)

DISPOSITION? Key in ",J" to monitor the execution; otherwise, hit CR to direct the program to print the report at the Mainline Printer.

Monitoring: After the program goes to a normal termination, it must be directed to either a remote terminal or the Mainline Printer as shown.

```
*JOUT "SNUMB"
Function?        LIST           or
                 DIRECT ONLINE  or
                 EPRINT 06      for remote terminal printing.
```

E. Harvest Level Alternatives

A 12-page typewritten summary report is prepared by the Allowable Cut Specialist explaining the principal details and results of the management decisions fed into each simulation modeling run.

F. SIMIX References

It is beyond the scope of this publication to explain any of the details of the SIMIX modeling system. Please refer to: USDA Forest Service General Technical Report; PNW-1; Users' Manual for a Computer Program for Simulating Intensively Managed Allowable Cut; Robert Sassaman, Ed Holt, and Karl Bergsvik. A detailed users' handbook is planned for publication in FY 81 by the DSC.

G. Potential SIMIX Users

Potential SIMIX users in the PD states must contact DSC foresters or the User Branch of Data Processing and obtain a custom-built Job Control Language and specific "Read Permission" for executing the SIMIX Program.

H. Sample Report (ADP Printout)

The following three pages have been extracted from a bulky printout of a potential harvest level alternative computed in cubic feet of merchantable timber. Page 130 shows an existing portion of the forest classified for harvest under a three-stage harvest removal system. Pages 131 and 132 show this portion of the forest during the 10th decade.

* * * ALLOWABLE CUT COMPUTATIONS * * *

* * EVENFLOW * *

-- YEAR 1980 --

AGE CLASS	TREATMENT CLASS	ACRES	TOTAL VOL M FT.	AVE ANNUAL GROWTH FT.	INITIAL TEST LEVEL VOLUME CUT M FT. COMM. THINNING	MORTALITY SALVAGE	FINAL HARVEST	ACRES P.COMM ONLY	P. COMM. THINNING	HARVESTED COMM. THINNING	MORTALITY SALVAGE	FINAL HARVEST
N/S	NON-TREATED	2940										
1-5	NON-TREATED	407										
10	NON-TREATED	2130										
20	NON-TREATED	407	0.	0.								
30	NON-TREATED	861	1068.	28437.	0.	0.	0.	0	0	0	0	0
40	NON-TREATED	3445	5401.	111489.	0.	0.	0.	0	0	0	0	0
50	NON-TREATED	2537	4790.	80416.	0.	0.	0.	0	0	0	0	0
60	NON-TREATED	5934	13066.	184146.	0.	0.	0.	0	0	0	0	0
70	NON-TREATED	2537	6365.	77042.	0.	0.	0.	0	0	0	0	0
80	NON-TREATED	7704	21642.	228828.	0.	0.	0.	0	0	0	0	0
90	NON-TREATED	6411	19893.	186159.	0.	0.	0.	0	0	0	0	0
100	NON-TREATED	4664	15811.	132329.	0.	0.	0.	0	0	0	0	0
110	NON-TREATED	4306	15804.	119308.	0.	0.	0.	0	0	0	0	0
120	NON-TREATED	2584	10192.	69878.	0.	0.	0.	0	0	0	0	0
130	NON-TREATED	2991	12596.	78895.	0.	0.	0.	0	0	0	0	0
140	NON-TREATED	1268	5670.	32603.	0.	0.	0.	0	0	0	0	0
150	NON-TREATED	1268	5992.	31760.	0.	0.	0.	0	0	0	0	0
170	NON-TREATED	1629	8492.	38636.	0.	0.	0.	0	0	0	0	0
190	NON-TREATED	814	4619.	18223.	0.	0.	0.	0	0	0	0	0
210	NON-TREATED	407	2486.	8570.	0.	0.	0.	0	0	0	0	0
230	NON-TREATED	407	2652.	8029.	0.	0.	0.	0	0	0	0	0
	INITIAL LEVEL	55651	156539.	1434749.								

ALLOWABLE CUT COMPUTATIONS 41250. M. CUBIC CUBIC DECADE CUT

* * EVENFLOW * *

2071 --YEAR 2080--> 2071 - 2080

AGE CLASS	TREATMENT CLASS	ACRES	TOTAL VOL M FT.	AVE ANNUAL GROWTH FT.	VOLUME CUT M FT. COMM. THINNING	MORTALITY SALVAGE	FINAL HARVEST	ACRES P.COMM ONLY	HARVESTED P. COMM. THINNING	COMM. THINNING	MORTALITY SALVAGE	FINAL HARVEST
20	P.COMM ONLY	584	633.	53479.	0.	0.	0.	584				
20	PC (C THIN	775	985.	85163.	0.	0.	0.	0	•775	0	0	0
	CLASS TOTAL	1359	1618.	138642.	0.	0.	0.	584	•775	0	0	0
30	P.COMM ONLY	2082	4117.	181199.	0.	0.	0.	0	0	0	0	0
30	PC (C THIN	2761	5893.	288352.	0.	0.	0.	0	0	Δ2761	0	0
	CLASS TOTAL	4843	10011.	469551.	0.	0.	0.	0	0	Δ2761	0	0
40	P.COMM ONLY	1536	4340.	126703.	0.	0.	0.	0	0	0	0	0
40	PC (C THIN	2037	5879.	201637.	0.	0.	0.	0	0	Δ2037	0	0
	CLASS TOTAL	3573	10219.	328340.	0.	0.	0.	0	0	Δ2037	0	0
50	P.COMM ONLY	2451	8891.	191048.	0.	0.	0.	0	0	0	0	0
50	PC (C THIN	3248	11451.	303806.	3248.	0.	0.	0	0	•3248	0	0
	CLASS TOTAL	5699	20341.	494854.	3248.	0.	0.	0	0	•3248	0	0
60	P.COMM ONLY	2373	10404.	174189.	0.	0.	0.	0	0	0	0	0
60	PC (C THIN	3145	12745.	277030.	0.	0.	0.	0	0	Δ3145	0	0
	CLASS TOTAL	5518	23149.	451219.	0.	0.	0.	0	0	Δ3145	0	0
70	P.COMM ONLY	2791	14222.	192195.	0.	0.	0.	0	0	0	0	0
70	PC (C THIN	3700	16529.	305750.	6290.	0.	0.	0	0	•3700	0	0
	CLASS TOTAL	6491	30751.	497945.	6290.	0.	0.	0	0	•3700	0	0
80	P.COMM ONLY	2895	16679.	186207.	0.	0.	0.	0	0	0	0	0
80	PC (C THIN	3837	18302.	296157.	0.	0.	0.	0	0	Δ3837	0	0
	CLASS TOTAL	6732	34981.	482364.	0.	0.	0.	0	0	Δ3837	0	0
90	P.COMM ONLY	1439	9184.	86021.	0.	0.	0.	0	0	0	0	0
90	PC (C THIN	1908	9464.	136868.	0.	0.	0.	0	0	Δ1908	0	0
	CLASS TOTAL	3347	18648.	222889.	0.	0.	0.	0	0	Δ1908	0	0
100	P.COMM ONLY	916	6373.	50596.	0.	0.	0.	0	0	0	0	0
100	PC (C THIN	1214	0.	80468.	0.	0.	0.	0	0	0	0	0
	CLASS TOTAL	2130	6373.	131064.	0.	0.	0.	0	0	0	0	0
110	P.COMM ONLY	407	3047.	20632.	0.	0.	0.	0	0	0	0	0
120	NON-TREATED	861	4833.	30274.	0.	0.	0.	0	0	0	0	0
130	NON-TREATED	3445	20535.	118076.	0.	0.	0.	0	0	0	0	0
140	NON-TREATED	0	0.	0.	0.	0.	6441.	0	0	0	0	1751

10th. Decade

ALLOWABLE CUT COMPUTATIONS 41250. M. CUBIC CUBIC DECADE CUT

* * EVENFLOW * *

2071 <--YEAR 2080--> 2071 - 2080

AGE CLASS	TREATMENT CLASS	ACRES	TOTAL VOL M FT.	AVE ANNUAL GROWTH FT.	VOLUME CUT COMM. THINNING	MORTALITY SALVAGE	M FT. FINAL HARVEST	ACRES P.COMM ONLY	P. COMM. THINNING	HARVESTED COMM. THINNING	MORTALITY SALVAGE	FINAL HARVEST
DECADE	10 TOTALS	44405	184505.	3385851.	9538.	0.	6441.	584	775	20636	0	1751

ACRES	CUT	1751	INGROWTH	97993.	PARTIAL CUT VOLUME	9538.	
TOTAL ACREAGE		44405	AN GRWTH	3483844.	TOTAL DECADE VOLUME	15979.	

XI. INVESTMENT ANALYSIS: IVST: Program L270

Forest management and other resource management proposals must be analyzed and pass an economic feasibility test before they can be considered viable proposals. The economic feasibility test requires that a project provide at least the minimum rate of return from capital invested. The rate of return for timber is the same as the current Federal Discount Rate applicable to water and land-related resources.

The Bureau's IVST computer program can be used for evaluating resource investment opportunities under three criteria: (1) Present Net Worth, (2) Benefit/Cost Ratio, and (3) Internal Rate of Return (under varying percentage rates of interest). Also, ADP printout data can be translated into graphic form for comparison purposes.

The internal rate of return computations can be used to conduct a cost-effectiveness analysis; the objective of which is to determine which alternative yields the greatest effectiveness for any given cost or to show which alternative yields a required degree of effectiveness for the least cost. Projects can then be ranked as necessary, and the optimum size of projects can be determined. Refer to BLM Manual Section 9522, Cost-Effectiveness Analysis, for the policies, procedures, and authority for conducting cost-effectiveness studies.

This chapter is designed to show the user how to operate the IVST program from a remote terminal. The program is set up to receive directions to find and use input data that the user has previously stored in a specific file.

An overview of the successful operation of the Investment Analysis Program is as follows:

- Design your investment problem.
- Fill out pages 1 and 2 of the IVST input form.
- Store the input data in a specific data file.
- Call in the IVST computer program from your remote terminal.
- Tell the program the name and location of your input data file.
- Execute the program and direct it to print your report at the desired location.
- Do another problem or sign off.

BLM Technical Notes 309 and 323, "An Economic Analysis Series for Screening Proposed Timber Management Projects," show several sets of completed IVST input forms and discuss much of the theory of economic analysis as related to intensive forest management.

A. Procedures

Complete all eight card format sections of the IVST input forms (see p. 141-142):

Steps Per Input Card
Card No.

1. Study Identification: Alphanumeric: 1-72 Characters.
Select a unique name for each individual study.

2. Problem Identification: Alphanumeric: 1-72 Characters.
Select a unique name or number for each individual problem in your study.

3a. Beginning Interest Rate: NN.NNN: Columns 5-10 Inclusive.
Select the lowest interest rate to be tested, which may be a negative number for subsidized operations.

3b. Ending Interest Rate: NN.NNN: Columns 15-20 Inclusive.
Select the highest interest rate to be tested.

3c. Interest Rate Increment: NN.NNNNN: Columns 23-30 Inclusive.
Select the increments between the lowest and highest rates to be tested. With an increment rate of one percent, a beginning rate of 00.000, and an ending rate of 00.010, 11 tests will be performed for this problem.

3d. Number of Alternatives: NN: Columns 39-40.
Up to 20 combinations of inputs may be listed under Step 7. Record the number of subproblems developed.

3e. Initial Cost or Return: N: Column 50.
Record the code for "yes" or "no" depending on whether costs or returns scheduled for Step 7 occur at the beginning or end of the investment period.

3f. Discount Cost or Returns: N: Column 60.
Record the code for "yes" or "no" depending on whether costs or returns are to be discounted back to the beginning of the investment period.

4. Names of Alternatives: AN: Columns 1-40, 4 Lines.
Draft a one-to-eight digit name for each of the subproblems recorded under Step 7. A maximum of 20 subproblems can be developed under each problem name.

5a. Problem Number: AN: Columns 7-10 Inclusive.
Pick a one-to-four digit problem number which refers back to Step 2 for problem identification.

5b. Type of Calculation: N: Column 20.
Insert the code for either a terminable or perpetual series of repeatable investments.

5c. Investment Criterion: N: Column 30.
Insert the code for the investment criteria desired, i.e., (1) internal rate of return, (2) benefit/cost ratio and present worth, or (3) all three criteria.

5d. Length of Period, Years: NN: Columns 39-40.
Record the length of the investment period for computational purposes. Nearly all investments are based on a one-year computational period.

5e. Maximum Number of Years in Series: NNN: Columns 48-50.
Record the maximum length of the subproblem investment series cited in Steps 4, 6, and 7.

6. Number of Years in Investment Series For Each Alternative: NNN: 20 Segments of 3 Columns Each.
Each of the subproblems may have a different length of investment period. All subproblems must be either terminable or perpetual as indicated by 5b.

7a. Cost or Return for Each Year: $NNNNNNNN.NN: Columns 5-15 Inclusive.
List all costs incurred before entering incomes. Costs may be incurred at the beginning or end of the annual or periodic length of the period selected. Correlate this item with 3e or 3f and 5d. Costs may be either positive or negative values indicating actual cost or costs foregone in the subproblem. Next, list all incomes anticipated. Incomes may also be received at the beginning or end of the investment period and may be positive or negative figures. Use as many Page 2's of the form as is necessary to complete the problem.

7b. Begin in Year: NNN: Columns 23-25.
Indicate the number of the year in which the cost is incurred or in which the income is received.

7c. End in Year: NNN: Columns 33-35.
Record the number of the ending year in which the cost or income occurs. A reforestation cost, for example, would be an initial cost that would both begin and end in Year 1. Protection costs would begin in Year 1 and occur annually to Year 80 for an 80-year rotation period. A perpetual series of 80-year rotations would be indicated by coding a "1" in Step 5b.

7d. Last Entry: N: Column 45.

Code a "0" in Column 45 for all costs except the last. Code a "1" for the last entry line for the costs incurred. This notifies the computer program that the next line entry will be an income item. Code the incomes listed in the same manner as designated for costs. Upon finding a "1" in the income column, the computer program is instructed to start a new subproblem or to end the problem.

8. End of Problem: 998 or 999: Columns 1 through 3 Inclusive.

Record "999" in Columns 1 through 3 to end the problem and terminate the computer program. If a project requires a study of 25 subproblems, it must be divided into two separate problems. A second set of forms, completely filled out, must then be prepared for the five subproblems that could not be included on the first set of forms. In this case, code a "998" in Columns 1 through 3, then the computer program will read the second problem and continue it to completion.

B. CRUN Listing and Job Control Language

```
-LIST RUNL270

##*NULL
OLD A185/JCL/EXL270,R
SYST
EDIT CASE
$*$MARK
$*$MARK
RS:/IIIII/
$*$USER= ENTER USER IDENTIFICATION.
$*$NULL
RS:/DDDDD/
$*$USER= ENTER CATALOG STRING OF DATA FILE.
$*$NULL
COUT NULL
RUN
COUT


*OLD A185/JCL/EXL270
<50>FILE EXL270 -- PERMISSION NOT GRANTED
*OLD A185/JCL/EXL270,R
*LIST
```

```
#N,J
$:IDENT:IIIII
$:OPTION:FORTRAN
$:SELECT:A134/OBJ/L270OBJ
$:EXECUTE
$:LIMITS:,35K
$:PRMFL:05,R,S,DDDDD
$:ENDJOB
```

C. Data Loading

Data from the completed IVST forms may be keypunched onto a key-tape by the Data Entry Branch. This key-tape must then be loaded into the Users UMC File.

Data from a completed set of IVST forms may also be entered directly into the Users UMC File through a remote terminal.

1. Use the A134/LOADDATA subroutine to load-key tape data into your user file. Refer to Section II, B, Time Sharing, /LOADDATA for the procedure.

2. Use the Save or Resave command to enter the contents of the current file onto your permanent disc file. Convert the file from ASCII, Conversational Language, to BCD, Machine Language. Refer to Section II, D. for the procedure on using the CONVERT subsystem. Record the name of the data file on the IVST input forms to prevent future mixups.

3. After the input data is loaded but before you begin program execution, check the printer settings. Increase the printer line to 140 characters in length.

D. Program Execution

To execute the IVST Program (L270), respond to the terminal queries as indicated:

Steps

1. When an asterisk appears, enter the command "A134/RUNL270."

2. The terminal will then print a request for user identification; i.e., ENTER USER IDENTIFICATION.

   Key in your user identification code and punch the carriage return key.

Users outside of the Denver Service Center who direct their reports to the central mainline computer high-speed printer are requested to enter their Mail Code and Name on the $IDENT card along with their UMC, i.e.,

```
                $IDENT  UMC, MAIL CODE NAME
      Example:  $IDENT  A999, UT-930 JANE DOE
```

This procedure will insure that the listing will be sent to the user in a timely manner. All listings carrying a mail code will be sent out as priority mail.

The first nine spaces following the comma in the identification card will be printed as the banner. The banner consists of one-inch high letters printed on the first page of each report.

3. Upon entering your identification codes into the program, a second message request will appear:

```
ENTER CATALOG STRING OF DATA FILE.
```

Key in the name of the data file that contains IVST input data and hit the carriage return key. The program should now go to a normal termination.

4. Input data has been copied from IVST Forms, Figures 1 and 2, and stored in catalog file string A134/DATA/DATA4. The following shows the action to this point.

```
*A134/RUNL270,R

ENTER USER IDENTIFICATION.A134,D450-FJHORAK
ENTER CATALOG STRING OF DATA FILE.A134/DATA/DATA4

$:PRMFL:05,R,S,A134/DATA/DATA4
```

5. When the - (dash) prompt appears, the user may (1) monitor the job execution to completion, (2) direct the report to the Mainline Printer, or (3) direct the report to be printed at the remote terminal.

   a. To monitor the job execution, enter "JMON" and the "SNUMB" as shown in the following:

```
-JMON 289OT
289OT -01   EXECUTING     ..
289OT OUTPUT WAITING      ID=;J.
*JMON WON'T MONITOR JOB IN SYOT OR SSFILE*

$:PRMFL:05,R,S,A134/DATA/DATA4
```

b. Instruct the computer to print the IVST Report:

The JOUT subsystem allows the user to manipulate the output from a batch job to a printer or terminal display. The JOUT subsystem also transmits a status message for uncompleted jobs.

(1) To direct the job to the Mainline Printer, enter the word "JOUT: and the "SNUMB"; the word FUNCTION? will appear. Type in the command DIRECT ONLINE or DIRE ONL. The Mainline Printer at DSC will accept the job.

(2) To direct the printing to the remote terminal, enter the "JOUT" command and "SNUMB." Enter the word "LIST" in response to the FUNCTION? prompt. The $$ activity code numbers of the job will then appear as shown, followed by the FUNCTION? prompt again.

```
-JOUT 2890T
FUNCTION? LIST
PLEASE DIRECT, RELEASE, OR HOLD BEFORE EXIT
FUNCTION?LIST
ACTIVITY 1
REPORT CODES
 $$
 74
 06

FUNCTION?
```

Enter the command "EPRINT" and the report code, which is "74" in the example above (EPRINT 74). The terminal will then print a listing of the subprograms used in making the IVST computation.

Upon the completion of printing Activity Report 74, the word FUNCTION? will appear again. In response to the FUNCTION? request: enter the command "EPRINT 06" to instruct the computer to print the remaining part of IVST report at your remote terminal.

E. Sample Report (Printout)

A sample set of completed IVST Forms, Figures 1 and 2, follow on pages 141 and 142 for your inspection. The problem listed shows the allowable cut effect of precommercial thinning a dense lodgepole pine stand. Please refer to BLM Technical Note 309 for the methodology used in computing the allowable cut effect (ACE).

Sample Inputs

Cost to thin one acre	=	$100.00
Increased yield	=	13,800 Bd. Ft.
Investment period	=	80 years
Maximum ACE (Annual)	=	172.5 Bd. Ft.
Effective ACE	=	50%
Cost to sell mature timber	=	$15.00/MBF
Income from mature timber	=	$100.00/MBF

(No other costs or incomes included)

The IVST report shows:

1. Annual costs and returns,
2. Present net worth of all benefits and costs,
3. Present net worth and benefit/cost ratios for the various interest rates selected, and
4. Internal rate of return, if within the selected range of interest rates.

Two copies of reports (printouts) were developed by executing program L270 using data shown on copies of the input forms, Figures 1 and 2. The only variation between these copies is a change in input code from YES to NO concerning Card #3, Column 50, Initial Cost or Returns.

These computer reports have been microfilmed. Copies of microfiche cards may be obtained by placing a request through the Division of Special Studies, Denver Service Center, as shown on the Interior title page.

"IVST" INVESTMENT ANALYSIS INPUT FORM

1 **STUDY IDENT.** (1-72) PCT @ 20 yrs. only: BLM Tech Notes #309 and 323

2 **PROBLEM IDENT.** (1-72) PCT Lodgepole Pine: SI = 40: 50% of A.C.E.

3

BEGINNING INTEREST RATE	ENDING INTEREST RATE	INTEREST RATE INCREMENT	NUMBER OF ALTERNATIVES	INITIAL COST OR RETURNS	DISCOUNT COST OR RETURNS
0.000	+0.20	0.10	01	0 ← (0 = YES, 1 = NO)	→ 0

NAMES OF ALTERNATIVES (1-20)

4

1001500	ALTERNATIVES 1-5
	ALTERNATIVES 6-10
	ALTERNATIVES 11-15
	ALTERNATIVES 16-20

5

PROBLEM NUMBER	TYPE OF CALCULATION	INVESTMENT CRITERION	LENGTH OF PERIOD, YRS.	MAX. NO. YRS. IN SERIES
A	2 (1 = Perpetual, 2 = Terminable)	3 (1 = IROR, 2 = BC & PNW, 3 = All three)	01	80

6 NUMBER OF YEARS IN INVESTMENT SERIES FOR EACH ALTERNATIVE (1-20)

080

FOR EACH ALTERNATIVE-LIST ALL ANNUAL COSTS FIRST: THEN ALL ANNUAL RETURNS.

TO INDICATE LAST COST OR RETURN-ENTER A "1" IN COLUMN 45.

"IVST" Investment Analysis Input Form

Cost to PCT = $100.00 per acre
Selling cost = 15.00 per MBF (Mature)
Income = 100.00 per MBF (Mature)
Effective rate = 50% ACE

	Cost or Return For Each Year	Begin In Year	End In Year	Last Entry	
7	100.00	0	0	0	COST TO PCT ONE ACRE
	1.29	1	80	1	COST TO SELL ADD. MATURE TIMBER
	8.62	1	80	1	ANNUAL INCOME FROM MATURE TIMB.
8	998 = DO ANOTHER PROBLEM				
	999 = END OF PROBLEM				

STEPWISE REGRESSEION-- SAMPLE PROBLEM--TECH. NOTE -F. HORAK A.